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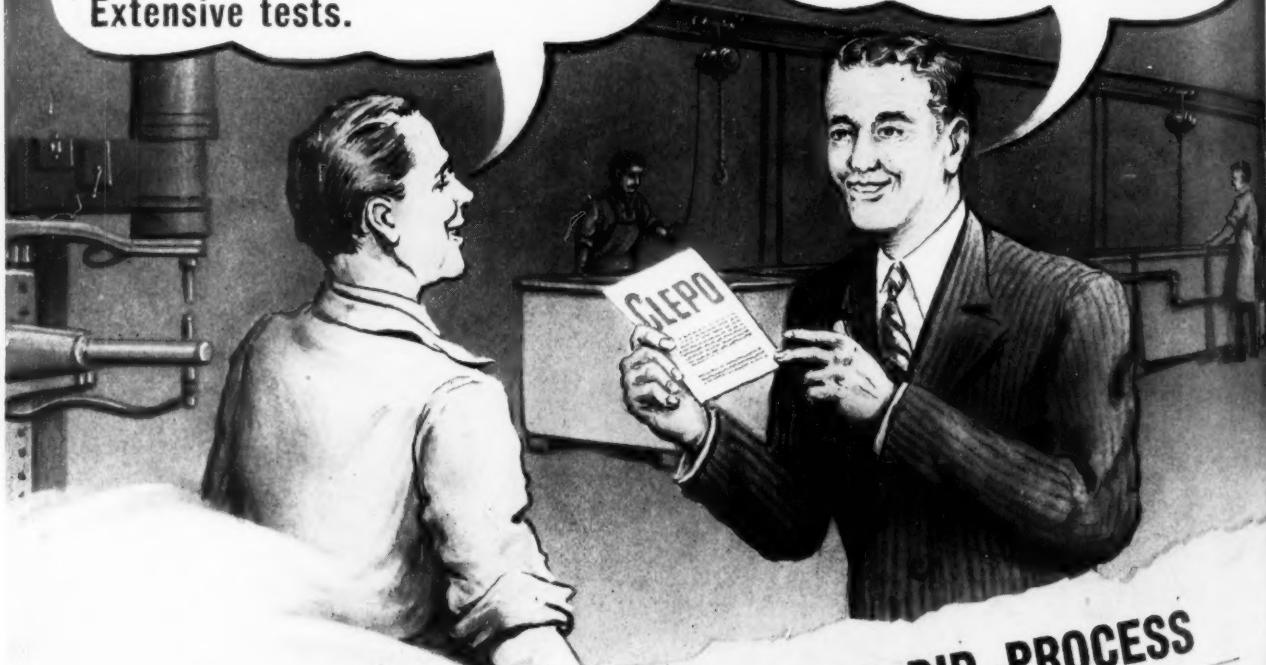


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to reduce wear

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to increase tool life

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This special issue covers the
1945 Annual Business
Meeting.

H-VW-M

Distributed daily at Ameri-
can Electroplaters' Society
Conventions since 1939.

Official Convention News

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Vol. 11, No. 1

PITTSBURGH, PA., MONDAY, JUNE 18, 1945

Free Edition

BUSINESS CONCLUDED BY BRANCH DELEGATES ONE DAY SESSION RESULT OF O. D. T. CONVENTION RULINGS ELECTIONS HELD; VOTE WAS PITTSBURGH AGAIN IN 1946

"The activities of the A.E.S. have been completed for another year. There is certainly no monotony in the way in which the Society must operate to serve its members to greatest advantage. That is, the past year has again brought us new problems and situations. The operation of the A.E.S. during wartime is something like many businesses in that it must be flexible and fluid to meet requirements. One example of this is the fact that we are here attending only a business meeting without our regular Educational Sessions": thus started the Annual Report of Supreme President Maurice R. Caldwell as he opened the 1945 Annual Business Meeting of the A.E.S.—a complete report of which appears on the following pages. To the left is shown a Pittsburgh view featuring the William Penn Hotel, meeting place; next Mr. Caldwell, now past Supreme President; and on the right, W. L. Pinner, newly elected Supreme President.



PITTSBURGH BUSINESS MEETING A SUCCESS AMENDMENTS PASSED—OFFICERS ELECTED

The Annual Business Meeting got off to an early start and lasted most of the day. Considerable progress was made on a variety of subjects, which will be reported later from Society headquarters.

Since this was the first time in 32 years that no Convention was held, the atmosphere was one of business rather than pleasure.

The opening addresses were well received and gave an outline of the Society's condition and the plans for future progress. Two highlights were the voting on amendments and election of officers.

The Montreal amendments, tabled last year, were rejected and the Newark Amendments substituted. Thus the existing status of membership is definitely changed.

The following officers were elected and properly inducted: W. L. Pinner, Supreme President; Frank K. Savage, Supreme 1st Vice-President; Ray O'Connor, Supreme 2nd Vice-President; and K. M. Huston, Supreme 3rd Vice-President.

Aside from all the Executive Committee, consisting of Officers and the Past President, the Branches represented and their official delegates were: Bridgeport, Raymond J. O'Connor; Boston, Robert Magnuson; Buffalo, William Hart; Chicago, Frank Savage; Cleveland, Ralph A. Schaefer; Columbus, William J. Neill; Dayton, Walter Moline; Detroit, W. L. Pinner; Grand Rapids, Maurice R. Caldwell; Indianapolis, Anthony J. Fritz; Montreal, John Feeley; Newark, George Wagner; New Haven, Walter Lynch; New York, Martin J. Maher, Jr.; Philadelphia, Joseph Underwood; Pittsburgh, Frank R. Keller; Providence-Attleboro, Charles C. Chace; Rochester, Robert Burnett; Rockford, J. Walter Eaton; Syracuse, Neil C. Maffei; and Waterbury, Anthony J. Maz.

Those Branches specifying proxies were Hartford Branch to Newark; Jackson-Lansing Branch to Grand Rapids; Los Angeles Branch to Chicago; Toledo Branch to Detroit; and Twin City Branch to Waterbury.

OUR DAILY POME

Though A.E.S. Conventions are called off 'till war is won,
And platers cannot travellers be
To have their annual fun:

Yet plating output stays at "tops"
Across the country's map;
It's helped to lick the Nazi
horde—
'Twill help to lick the Jap!



Frank Savage, C. G. Conn Company, Elkhart, former 2nd Vice-President and newly elected Supreme 1st Vice-President.

GARTLAND MADE HONORARY MEMBER

Sylvester J. Gartland of the Rochester Branch was voted an Honorary Member of the Society at the Annual Meeting.

Mr. Gartland is a past Supreme President and has been closely associated with electroplating for many years. He started as a polisher in a plating shop before the turn of the century and worked his way up through practically all branches of the industry. He is now a Consulting Plater associated with the Rochester Products Division of General Motors Corporation.

NEWS NOTES

John J. Pittman, Chief Chemist, Hawk-Eye Works of Eastman, Rochester, is getting to be quite a numismatist — coin collector to you. We are still waiting to hear a story about it in which John is "done in" by some more astute numismatist. Somehow, he always gets the better of the deal. Chemist Joe Hull and Plating Foreman Bob McGrail, also at Eastman, will attest to that—from the stories if not from actual experience.

"Kenny" C. Bulkley, V.P. and "Bev" Eyre, Chemist, from American Sanitary Mfg. Co., Abingdon, Ill., had figured on attending the Convention. If anyone desires more knowledge on the subject of contract bridge (and who that plays doesn't?) let him apply to Bev Eyre. He's in a class with Ely Culbertson himself.

Dwight Overcash and his associates at the Brown-Lipe-Chapin Division of General Motors, Syracuse, are working hard these days on readying for bright work on the '46 G.M. cars. That means for sure that said bright work will be better than ever.

We believe that Harry W. Sievering holds a record for the largest fish in the plating industry—A 680 lb. Tuna, landed in 45 minutes, caught off Nova Scotia. Mrs. Phillip Sievering Jr., much to the embarrassment of her husband, who was fishing from the same boat, received a gold button for the largest sailfish caught in a fishing tournament off Florida. This is also a record for feminine sex.

Jack Bunch's talk to the Detroit Branch of the A.E.S. in April on the subject of "Plating Racks" was given before one of the largest attendances ever held. His talk was in line with the Foremanship Training Book that he has recently compiled and was extremely well received.

Paul Swartz would tell you that big things have happened since the A.E.S. Sessions last year in Cleveland. He might even say that the biggest and best is the new male addition to his family. Paul has been a big factor in re-conversion as Chief Metallurgist of L. C. Smith & Corona Typewriters, Syracuse.



Ray O'Connor, Contract Plating Company, Bridgeport, former Vice-President and newly elected Supreme 2nd Vice-President.

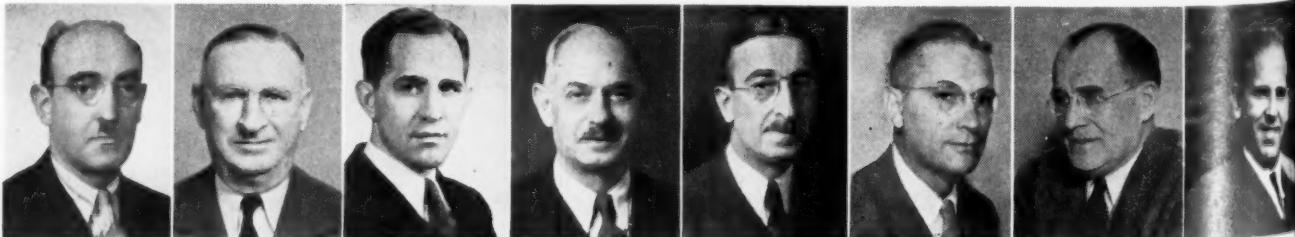
ABOUT NEWS-MAKERS

It is a long way from Juarez to Rochester, but Sue Johnson somehow makes it for Rochester Branch A.E.S. Meetings. The good old days will be back when Siebert holds again as host at a Jamestown A.E.S. picnic, where the clam bones, clam shells and corn used to pile high, and butter something to put on everything.

J. L. Kremer from Imperial Brass Mfg. Co. had planned to be at Pittsburgh. We wonder whether Mr. and Mrs. Kremer still remember the whales they saw swimming close to the beach in Asbury Park at that A.E.S. Convention?

Walter Lockerbie from American Phenolic Corp., Chicago, recently told our reporter that he was expecting to start work with his brother, John, at Standard Plating in Goshen, Ind. We are sorry to see him leave Chicago. Ernie Stenberg will replace him.

Lee J. Evans of Sanders Engineering and his son Jake from Engineering Laboratories, Inc., Tulsa, Oklahoma, were looking forward to the 1945 Convention. And course their wives. This father-and-son team is the hardest working team we have ever seen.



Since no group picture of the Pittsburgh Branch General Convention Committee was taken, various committee chairmen who planned for the 1945 meeting are shown above. From left to right: R. A. Dimon, Educational; J. L. Wray, Hotel; W. J. Hennessy, Publicity; H. F. Sauer, Entertainment and Banquet; L. J. Schmitt, Registration; R. D. Hummel, Transportation; W. S. McKeon, Exhibits; and F. R. Kelly, Secretary-Treasurer. Due to recent illness of S. S. Johnston, General Chairman, his picture could not be furnished. Mrs. Dimon of the Local Committee is shown elsewhere in this issue.

DR. GRAHAM IS NEW EXECUTIVE SECRETARY**A.E.S. OFFICES TO JENKINTOWN, PA.**

A. Kenneth Graham of Crowley & Associates, Jenkintown, Pa., has been selected as Executive Secretary and Business Manager of the Society. The executive offices are being moved to offices adjoining those of Graham's company and the "S. Review" and other publications will be handled from this location. The official address is Box 168, No. 471 York St., Jenkintown, Pennsylvania. Graham's background and experience is already well-known among members, but a brief sketch may bring some of the



A. Kenneth Graham, new Executive Secretary and Business Manager of the Society.

members up-to-date. Dr. Graham attended the University of Pennsylvania and Columbia University; he was then connected with Scoville Manufacturing Co., Hartford-Sterling Co.; he returned to University work for a period; went with Hanson-Winkle-Munning Company in research work; later took charge of Technical Engineering at the University of Pennsylvania; and in 1942, he devoted his full time to consulting work operating as Kenneth Graham and Associates. In June of the following year took a confidential project for the War Production Board as a consultant on electro-plating, and with the completion of his war assignments, Dr. Graham formed Graham, Crowley & Associates, Inc., consulting electrochemists and engineers. Associated on the new assignment will be W. C. Pinkerton, who have charge of the advertising and printing make-up of the "S. Review". Mr. Pinkerton had broad publishing and advertising experience with the International Nickel Company.

GAVELS TO OFFICERS FROM FRANK SAVAGE

One of the interludes greatly appreciated during the Annual Business Meeting occurred when Frank Savage of Conn Instrument Company, Elkhart, requested the privileges of the floor to present two handsome gavels to officers.

The first went to Supreme President Maurice R. Caldwell, Doeher Jarvies Corporation, Grand Rapids, as a memento of his successful term. The second went to newly elected Supreme President Walter L. Pinner, General Spring Bumper Division of Houdaille Hershey Corporation, Detroit, to be used to carry on another successful term during the coming year.

These two gavels were each marked with an engraved plate, and, although Frank Savage stated that he had found it difficult to obtain the second-grade yellow pine necessary, they were actually made of polished Grenadilla wood which is a semi-tropical growth from Mozambique, South Africa.

Needless to say, they were both accepted with appropriate thanks and used during the meeting.

HIGH-UP CLOSE-UPS

Charlie Logan, President of Buffalo's A.E.S. Branch, also President of the Logan Platers, Inc., and man with "Other Titles Too Numerous to Mention" was favored last month with army furlough visit from son John. Both are looking forward to the time it is all over and Harry, Senior Logan's other son, joins them in their promising postwar ventures.

C. W. Carter from Automatic Electric Co., in Chicago, who still runs around in single blessedness would have been on hand had the A.E.S. met. Yes, this handsome bachelor is the efficient Librarian of our Chicago A.E.S. Branch.

Warren Remington of A.C. Spark Plug is extremely busy and awaiting final plans for postwar automobile production.

RANDOM JOTTINGS

Joe Ruff, Foreman of Finishing at Trico Products Company, Buffalo, and long term Past-President of Buffalo's A.E.S. branch, is recovering nicely from an ankle infection that had him in limited circulation for months. Joe's many well-wishers are glad to see him back on his feet—both of them.

M. E. Kilroy severed Detroit connections a few months back and brought his years of experience in metal finishing to the Daystrom Division, American Type Founders, Inc., Olean, N. Y. We have it that Gene is doing a fine job there as Chief Metallurgist.

Some of those who planned to attend the A.E.S. Convention had it been held this year are: Harry S. Sandberg and Oscar Weickmann from Great Lakes Plating & Japanning Co., Chicago; Ed Smith, Joe Claffey, Robert Nicholson, and wives from the Mercil plants, Chicago; George Westerberg from Mechanical Plating, Chicago; Otto W. Waarick and Marion Longfield from Phoebe Mfg. Co., Chicago—and of course their wives and Miss Abbott, their traveling companion; O. T. Towner from J. P. Seeburg Corp., Chicago; Harvey Shaw and his wife from Coleman Lamp Co., Wichita, Kansas; W. A. Hartman and Cecil Thompson from Beech Aircraft, Wichita; Claude Heil and his wife from Western Plating, Wichita.

Dave X. Clarin of the Fellowship Club, better known as "Aunt Ella," helped keep up the hospitality of the Club during this "off" year by inviting delegates and their friends to his "Fellowship Room." Those who dropped in were warmly welcomed and greatly enjoyed Dave's usual line of good stories.

Leonard Weeg, formerly connected with American Nickeloid of Peru, Illinois and now with C. G. Conn, Ltd., of Elkhart, Indiana, was recently promoted to the position of Chief Chemist.

ONLY TWO AWARDS GIVEN THIS YEAR

Due to the fact that the Convention was cancelled at such an early date, too few papers were received to present the usual Awards annually designated at previous meetings.

It was also decided by the Executive Committee that "Proceedings" would not be published this year but that the technical papers received may be sent by the writers to any of the magazines covering the field for later publication in their pages. However, the Research Committee will publish its annual report and send it to all members and contributors.

The two Awards presented at the Business Meeting were: the \$50.00 prize for the best article in the "Monthly Review" which went to W. L. Pinner and R. B. Kinna for a paper entitled "High Speed Nickel Plating"; and the A.E.S. Gold Medal to D. G. Foulke for a series of articles entitled "Colorimetric Methods as Applied to the Analysis of Electroplating Baths." Honorable Mention went to B. F. Lewis for a paper entitled "Adhesion of Electrodeposits".



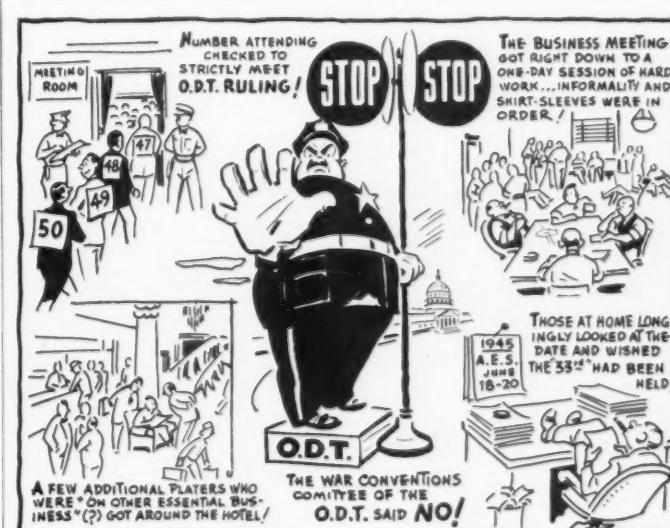
B. F. Partlett, Jr., Pittsburgh manager of Hanson-Van Winkle-Munning Company, who attended the Annual Business Meeting.

ITEMS OF INTEREST

Chief Metallurgist Irv Psyck, Metallurgist Hank Holbert and Plating Foreman George Skinner of the Easy Washing Machine Corporation, Syracuse, could well collaborate on a book on how to plate fuzes the Easy Way, holes and all. Reconversion will be taken right in stride by that trio.

Every time we see a Hickok belt buckle we think of what the sad plight of the nation's "trousered" would be if men like Elmer Nil, who is in charge of Hickok's plating and polishing at Rochester, did not somehow keep 'em coming. Elmer feels good these days about the whole thing, now that the metals outlook is brighter.

Bob Olson of Ternstedt Mfg. Company can sure stay calm and serene while going through the process of reconversion to postwar automobiles.



1945 COMMITTEES COMPLETED PLANS

Although the Office of Defense Transportation cancelled the 33rd Annual Convention of the A.E.S. due to its necessary war-time policy of keeping travel to a minimum, yet the Pittsburgh Branch Committees had already started functioning and had completed considerable "leg work" to round out advance plans for the meeting.

Certainly, the 1945 Pittsburgh Convention Committee deserves praise for its advance work and the entire membership joins in hoping that these preliminary arrangements will ease the Committee's job next year.

As usual, the principle praise goes to the Committee Chairmen — since they are the ones who bear the brunt of the work and carry the chief responsibility. At the head of this list comes S. S. Johnston, General Chairman. Then follows: R. A. Dimon, Educational Chairman; J. L. Wray, Hotel Reservations Chairman; Leo J. Schmitt, Registration Chairman;



Mrs. R. A. Dimon who was Chairwoman of the Ladies' Committee of Pittsburgh Branch General Committee for the postponed 1945 convention.

W. J. Hennessy, Publicity Chairman; H. F. Saylor, Entertainment and Banquet Chairman; R. O. Hummel, Transportation Chairman; Wilfred S. McKeon, Exhibits Chairman; F. R. Keller, Secretary and Treasurer of the General Convention Committee; and last but not least, Mrs. R. A. Dimon, Chairwoman of the Ladies' Committee.

WEATHER REPORT

How was it where you were on the 18th? If bad, you probably hoped it was the same for the lucky few at Pittsburgh. If good, you probably hoped it was just the opposite there. So, have it your own way. We won't tell whether the business meeting delegates sweltered or froze. But we predict fine weather for the next A.E.S. Convention!

RADIO FLASHES

Robert E. "Bob" Flint left Kodak Park last year to take over the Plating and Polishing Departments of the Ritter Manufacturing Company, Rochester. The next time you are sitting in a dentist chair, look around and you will see some of Bob's fine finishing on the equipment.

Bill McKeon, Plating Supervisor of Reo Motors, Inc., had his son Joe home on leave recently from his aircraft carrier after a course of 16,000 miles and many battles. His other son, Bill, is still in the Pacific on an LCI boat.

We were extremely sorry to hear of the loss of Mr. Clifford Rhead's son who was killed on Iwo Jima. Mr. Rhead is superintendent of plating at the Michigan Die Casting Company.

"Kenny" Robins from G. S. Robins, St. Louis, had lined up his usual delegation for the trip to Pittsburgh. His group consisted of C. T. McGinley of Wagner Electric Co.; John Vogt of Knapp-Monarch; E. A. Rothman of City Plating & Mfg. Co.; Larry Lopkin of Lincoln Engineering; Mr. Musick of his own shop; Bruce Roberts of Emerson Electric; George Reuter of Amertorp Corp. and others.

Had the Pittsburgh A.E.S. Convention met, everyone would have missed the presence of Frank Hanlon from Chicago City Plating. Frank passed away in the latter part of March quite suddenly. He had been active in the A.E.S. since its start. His brother, Jim, equally as widely known, now carries on alone. We wish him good fortune and we all extend our deepest sympathy to his family.

We hope that Ham Allen, Ed Jones, Dan Gray and Lou Jones will favor us next Xmas with another card like the one they sent out last year from Oneida's Limited Works Laboratory. Maybe this time they will show us how cigarettes are made, since what they seem to be making in 1944 can now be bought over the counter.

The Montreal Branch holds its Silver Jubilee meeting this fall and wishes to celebrate its 25th year by having at least one Supreme Officer present — but adds that all members from all other Branches are also invited.

Vincent Mattacotti, formerly connected with Hanson-Van Winkle-Munning Company as service engineer and later with C. G. Conn, Ltd., of Elkhart, Indiana as Chief Chemist, has resigned this position. On March 1, 1945, he joined the firm of Milwaukee Plating Company as a partner.

METAL INDUSTRY GAVE LUNCHEON BETWEEN SESSIONS

After the morning sessions of the Business Meeting, the officers and delegates with their friends moved into an adjoining room at the William Penn Hotel and enjoyed a luncheon given by the Metal Industry Publishing Company, publishers of "Metal Finishing" and "Organic Finishing".

The host was, of course, genial "Tom" Trumbour, General and Business Manager of that company, and almost as well known as the perpetual Secretary of the International Fellowship Club.

There were slightly over fifty who attended the lunch and all enjoyed the splendid meal and the chance to get relaxed between meetings. At the afternoon session a resolution of thanks was passed in appreciation of this entertainment.

RUSHES BY WIRE

Ray Goodsell of the Racine Plating Co., Racine, Wis., is ill at his home in Racine. Ray is a past president of Branch and his many friends will all wish him a speedy recovery.

We are glad to report that Bob Steurnagel of the S. K. Williams Co., seems to be on the uphill road.



Ellsworth J. Candee, Executive Secretary of the Metal Hose Company, Waterbury, who retired as Executive Secretary after having successfully served for several years.

ROVING REPORTER

Tom Trumbour, who has missed a single one of the A.E.S. Conventions, was again on hand at the Pittsburgh Business Meeting, thus checking in for the 18th consecutive time. But Tom arrived at the Newark railroad station on Saturday night a bit out of breath because his automobile had been broken into during the afternoon, the lights left on and the battery was dead.



AFTER EVERY MAJOR WAR in which the United States has taken part since 1812, post-war plans and re-conversions have taken place.

Plating, as known today, was very much in its infancy after the ending of the Civil War in 1865. Then followed post-war periods of the Spanish American War in 1898 and World War I in 1918 — with plating becoming progressively more important.

After each of these wars, plating developed and expanded into new commercial uses never previously contemplated. After each of these wars, H-VW-M participated in the post-war planning of the plating industry — foresaw new needs for plating processes, methods and equipment — co-operated toward better peace-time finishes.

Soon, when World War II is over, plating will be still further advanced — through new, improved, tried-and-tested developments which have placed the industry in the forefront in helping to win this war.

And, again H-VW-M is ready to participate in post-war planning — ready to help the electroplating industry push ahead to newer horizons.

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PLATER OR FOREMAN

Twenty-five or thirty years ago the average plater was a combination of artist and alchemist, who was expected to perform mysterious acts with solutions of various chemicals and a source of low voltage direct current. Specification plating and analytical control were almost unheard of, solution formulas were secrets to be treasured and imparted only to trustworthy members of the plater's circle, and conventional practice was to remove the identifying labels from all packages of chemicals, so that those unlearned in the art would not know how the solutions were made up and maintained. In those days the qualifications of a plater were ability to prepare solutions and produce finishes. Whether or not he could handle help was not considered of any importance, since he generally worked at the tanks himself and production requirements were moderate at the most.

The picture has changed since those days. Copies of Langbein are no longer kept in the safe, formulas and information are available for the asking and the sense of taste has been superseded for solution maintenance by the laboratory. Although a number of small plants are still doing things the old way, the progressive manufacturer with a modern, up-to-date plating department is not as interested in a plater as he is in a plating foreman, a man who can handle help and turn out production. The plater in the large plant has seen his solution control taken over by the plant laboratory and his deposit control taken over by the engineering or inspection department. His most important duty, however, the supervision of the plating room and its crew, cannot be handled by another department.

The obvious conclusion, therefore, is that a plater is not an important cog in the production machine but that a foreman is a necessity and this is confirmed by the operation of many large plating departments in war plants under the supervision of men who had practically no previous plating experience. The post-war competition for jobs in the plating industry should be an incentive to study the subject of foremanship, since ability to handle men will undoubtedly be as much of an asset as technical knowledge, if not more.

One Day Meeting Held by A. E. S. Delegates at Pittsburgh, June 18th

DU^E to travel restrictions the Annual Conference of the American Electroplaters' Society was postponed indefinitely, but the delegates held a one day meeting at Pittsburgh and elected officers for the coming year and appointed a new Executive Secretary and Business Manager.

Preprints of the papers which were to be presented at the 33rd Annual Conference will be forwarded to all members of the

Society and will then be published together with written discussion in the bound volume of the annual proceedings of the Society.

Election of Officers

Walter L. Pinner of Houdaille-Hershey Co., Detroit, Mich., was elected Supreme President; *Frank Savage* of Conn Instrument Co., Elkhart, Ind., was elected First

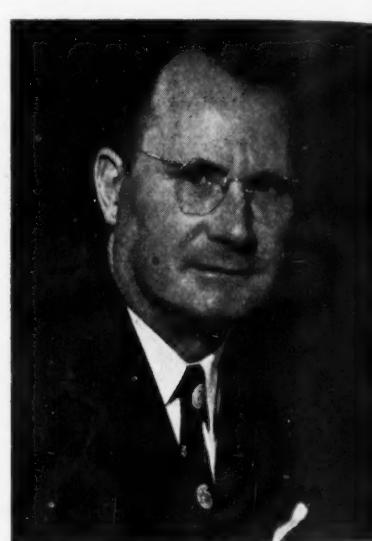
Vice-President; *Ray O'Connor* of Contract Plating Co., Stratford, Conn., was elected Second Vice-President; *Kenneth M. Huston* of Western Electric Co., Inc., was elected Third Vice-President; *Dr. A. Kenneth Graham* of Graham, Crowley and Associates, Jenkintown, Pa., was appointed Executive Secretary and Business Manager. Dr. Graham will also be the new editor and publisher of the Monthly Review.



Walter L. Pinner
Supreme President



Frank Savage
Supreme First Vice President



Ray O'Connor
Supreme Second Vice President



Kenneth M. Huston
Supreme Third Vice President



Dr. A. Kenneth Graham
Executive Secretary and Business Manager



Maurice R. Caldwell
Past Supreme President

HUMAN ENGINEERING*

By RALPH A. LEE

General Motors Corporation

IN SPITE of the many years I have been called upon to speak in public I have never been able to overcome the tendency of my knees to shake. They are doing it now, as I face a group who are outstanding leaders in an industrial field of which I know practically nothing.

Although I have been on the receiving end of the plating industry as an engineer depending upon your knowledge and skill for the successful completion of my tasks, I have never had the opportunity of getting into the technical side such as you have been discussing here today. I was delighted to find, however, as I listened to the discussion that the subject matter was not entirely over my head. I found that your profession has much in common with many other departments of industry and that your society has distinguished itself on the same basis as other technical societies—that being the discovery of facts with which to remove the guess, cut and try, rule of thumb procedures so costly to any activity.

I think you will all agree that the micrometer, Johansson measuring blocks, precision indicators, scleroscope, pyrometer, anemometer, voltmeter, ammeter and all the other metallurgical and chemical measuring devices lie at the bottom of the American quantity production system of manufacture which has lifted our nation head and shoulders above any other in standard of living and has recently enabled us to turn the tide of this horrible war.

For seven years I measured various parts of cash registers which up to that time had been manufactured without a blueprint in the plant. Models were used instead. When a blanking die wore out, the toolmaker would scribe around the model on a die blank and then drill, saw, chisel, and file to the mark. We had no heat-treating departments in those days, so after the punch and die had been fitted the toolmaker sent both to the blacksmith's shop. Evidently our tool steel and heat-treating procedures were not as good as they are today for sometimes the die expanded—so when the boss was not looking the toolmaker employed a scientific instrument known as a ball peen hammer to peen out the model to fit the die. When the grain of the tool steel ran the other way, the toolmaker might find it necessary to employ another scientific instrument known as a bench vice with which to squeeze the model to fit the die which had shrunk. From the many expandings and shrinkings to which the models were subject over the period of years, I'm sure you can see why it took in

some cases 3½ years of apprenticeship to make an assembler.

My job with my surface plate, angles, vernier height gauge and mikes was to measure these maltreated models and then through layout on the drafting board FBI the mechanism back to the original concept of the inventor. Through this process together with many changes we managed to produce a set of prints with dimensions and tolerances which would permit modern quantity production.

As a result of this experience I have since been vitally interested in all types of precision measuring instruments and the facts they produce such as you have discussed here today—facts with which to settle arguments between individuals and groups who with opinions instead of facts hold back progress in any industry.

However, in spite of all our accurate facts regarding the physical or material elements which enter into the conduct of modern American industry, we are still forced to use the long discarded, pre-mike cut-and-try, personal opinion methods for dealing with the most important industrial elements of all—the human element. For, as far as I know, no one has yet invented a *Humanometer* with which to measure the human characteristics, the breadth, strength, hardness, elasticity, crystallization and boiling points of the individuals who compose our industrial organizations.

So, without such an instrument and the facts they might provide, employee relations in industry today is far too frequently one constant round of argument and debate between individuals and groups who, with few facts, hold conflicting opinions and beliefs as to what is right and what is wrong in the realm of human relations.

With employee relations the universally recognized bottle neck to our future industrial progress—and the most pressing immediate problem we now have to face—it becomes quite apparent that we need all of the unbiased and accurate facts regarding personal relations in industry we can possibly get hold of.

While it is a pity that we do not have a "humanometer" or a handbook of accurate human relations facts and formulas comparable to our machinery, electrical, chemical or other technical handbooks, I can't help but feel that there must be a few dependable facts scattered around in the minds of successful factory managers, personnel men, supervisors and foremen—those who have built our American industrial organizations or who now direct the efforts of the individuals who compose them. For, in spite of occasional flurries of labor difficulties, any honest person has got to admit that most of

the time most of our organizations get along pretty well together.

So, playing this hunch, I have started a fact pool into which I am asking the successful factory supervisors I meet on my travels to toss any leadership facts or formulas they feel they can spare. I am getting rather excited about the way my pool is filling up, for most of the people I solicit find, upon rummaging in their minds, that they are using far more human relations facts than they knew they had.

While I don't want to go off half cocked, I am beginning to believe that we are going to find more real information on human behavior and how to get along with people in the minds of our practical shop people than is contained in all the academic text books put together. Once these facts are assorted, maybe cleaned up a bit and shared with each other, I wouldn't be surprised to find that we already have enough sound information to get personal relations in industry out of the pre-mike guess-and-by-gosh category onto a more businesslike basis.

The trouble with us has been that we have sort of taken human relations in industry for granted or have been so busy with organization and production problems, break downs, strikes and other emergencies that we haven't had time to back away from it all long enough to take an inventory of our mental stock rooms.

While I haven't had time to even count the facts my fact pool already contains let alone evaluate or classify them, I have found so many exactly alike that I thought you might be interested in checking the more important of these against your own personal experience. So with your permission I would like to start off with the most common fact in the lot:

Fact No. 1—Everyone Is Different and the Only One of His Kind

So far, I have met no one who questions this fact. While I have never met the individual members of your departments I would be very much surprised if it did not contain the following types of people:

The Bully—who tries to force himself into a position he has not earned or is capable of holding. *The Smoothy*—who tries to haggle his way into the same spot. *The Clown*—who insists upon attention, whether favorable or not. *The Smart Alec*, *The Bluff*, *Cry Baby*, *Tattle Tale*, *Pouter*, *The Trouble Maker*, *The Peace Maker*, *The String Saver*, *The Spendthrift*, *the Gambler*, *The Play Safer*, *Fuss Budget* and *Scatterbrain*. Also the chatter box, the sphinx, itchy fingers, jack rabbit and snail; *Prevaricators* in the kinder sense of the word, the *Thinker-Uppers*.

*A talk given at the Boston Branch of American Electroplaters' Society Annual Meeting, March 3, 1945.

who rarely can lead, the Leaders who rarely are creative. The natural born stockkeepers and accountants, and, thank God, the normal *Salt of the Earth* in a majority who can always be depended upon to go more than half way in any worth-while direction. And all of these in various degrees and proportions producing individuals separate and distinct from their fellows.

With sufficient experience we are forced to the conclusion that we are always going to have these types to deal with—either pure, or in different combination—no matter where we go or what we do. Sooner or later, we are bound to conclude that if we, as leaders, are ever going to accomplish what we set out to do, we are going to do it with the people we've got—with all of their imperfections, peculiarities and provoking traits.

The thought occurs to me that we might compare the different human materials of which our departments and organizations are composed with the materials we use in our work. As an illustration, let us imagine that we have before us a miscellaneous assortment of materials. Over here is a grey iron casting, one of malleable beside it, a steel casting and forging close by, alongside a piece of drill rod and cold rolled steel. This piece here is a copper bar and that is a coil of spring music wire. Then on this side we find a sheet of aluminum, one of galvanized iron, terne plate, tin plate and hot rolled iron.

We know from experience that a drill ground to go to town in this steel casting would certainly play hob if turned loose on our brass casting. If we were dumb enough to apply zinc oxide flux to our sheet of aluminum and try to solder the galvanized iron to it, it simply would not stick. We know, or we couldn't hold our jobs, that each of these materials has definite and distinct characteristics and, as a result, each required different treatment to get results. This being the case, we know definitely that no general set of rules or scheme of processing can possibly work with equal effectiveness on this chop suey of material.

Whether we have recognized it or not, the human material with which we must work varies in nature, use, and behavior just as much as our physical materials. And because this is true, we cannot expect any general set of rules, policy or any group agreement, no matter how representative or fair it may be to prove equally effective in dealing with all the individuals who compose our departments and organizations. I wouldn't be a bit surprised to find before we get through that much of our labor trouble has come about as a direct result of trying to handle widely differing individuals on a mass production basis.

Going back to our raw stock, doesn't it stand to reason that we can't do anything constructive with our assortment of materials unless we know exactly what we have in the assortment? Unless we take each piece, examine it carefully and get acquainted with it sufficiently to know what it really is, how can we possibly use it to advantage?

By exactly the same token, we know that we cannot possibly use the human material in our organization stock unless we get ac-

quainted with it to a point where we know exactly what each type is. So it becomes perfectly obvious that no supervisor can lead the differing individuals under his direction unless he takes the time to get accurately acquainted with every one of them. There is nothing new in this thought—in fact, it is elementary, and yet I am sure you will agree that under the press of general problems and our personal ambition to carry through the project for which we are personally responsible we do fail to find the time it takes to get accurately acquainted with our people. All of which brings up the next fact in our fact pool:

Fact No. 2—Most People are What They are Because They Can't Change or Be Changed Much

Let's take brass for instance. With copper as a base we may add various quantities of tin, lead, zinc and other substances and produce a variety of materials ranging from soft yellow brass to hard red bronze. And we will have to admit that there is quite a difference between brass and bronze. However, as great as this difference is, we know we wouldn't get very far with a bronze lathe tool. In other words, the degree of change we can possibly make in copper is limited—so limited in fact, that copper alloys can only be used in certain places and for certain purposes, no matter what we do to them or do with them.

The difference between cast grey iron and high speed steel is great, and yet, as great as it is, it is limited by the basic characteristics of iron. No matter what you do to iron, you can't make it into brass or aluminum. Again, and to a marked degree, we have a parallel in the human materials we deal with. People can only change or be changed within the limitations of their basic characteristics. Yet in spite of knowing this to be true, I am convinced that we, preoccupied with other matters, have wasted time, effort and money trying the alchemist's trick of making over a copper alloy individual to fit the specifications only an iron base personality can meet. I am afraid that some of our employee relations difficulties can be traced to supervisors who approach their employees as though all of them could make themselves over into what the supervisor wanted them to be if they only tried. It might easily be that far too much of our human scrap comes about through mistakes like these. To my way of thinking we may accept the fact that people of one type can not change much more than material of one type can be changed.

When we can't get steel we sometimes use malleable iron. When we can't get aluminum sometimes brass has to be used, but the successful substitution of these materials depends upon an accurate knowledge of their characteristics and allowances made for their limitations. There have been far too many men broken by trying their best to be what they were never cut out to be.

The next fact in order from our fact pool might be this:

Fact No. 3—No One Individual Is the Same All the Time

Unless we know the condition of a given piece of steel we can't use it effectively. Has it been hardened? The temper drawn? How far? Or has it been annealed? How hot was the grey iron poured? Does it have hard spots from being chilled? Or was it left in the mold to cool slowly? Is the brass brittle from overwork? Or has it been annealed? In other words, what is the condition of the materials we have to deal with?

In addition to knowing what materials we have and their fundamental characteristics, we must also know what they have been through or how they have been treated before we can get the best out of them.

A slap on the back with a "Hi, you big so and so" might bring a "What's it to you?" in the best of spirit and good will under certain conditions. But the same approach to the same individual at another time when his only child is not expected to pull through would be entirely out of order. The first day back after a siege of sickness is no time to jock a fellow up. The day after a night before would be a poor time to start even the most capable individual on a vitally important and tough new job.

As a result of experience, we have learned that state of health, state of mind or state of nerves resulting from financial worries, home trouble, social problems, work problems, boss trouble, or union trouble all affect the behavior of the individual, regardless of his type. So even though we do know the kind of a person each of the individuals who work for us is, we cannot lead him effectively unless we know through daily person-to-person contact his state of health, nerves and mind. I think you will all agree that far too frequently too many individuals rarely meet their bosses except when their work falls way below par or rises way above. Under these conditions it is possible for a normal fellow to do a good job day in and day out with never a visit from his boss. It would be nothing short of a miracle if under these conditions enough contacts would be made to enable such a boss to keep in touch with the state of health, mind or the temper of that individual.

Fact No. 4—Everyone Is Proud of Being Different

In spite of societies, associations, orders, organizations and unions and the joining epidemic that seems to be sweeping the earth, the members of all groups are fundamentally and incurably individualists at heart.

It seems that no one is ever wholly comfortable or truly himself in the presence of a group. Most people get away from the group as soon as they can and never join one except in an effort to get what they think they can't get alone. Either that, or as a last resort to protect their right to be and to be recognized as a separate and distinct individual—the only one of their kind in the world.

I am convinced that equal to our need for food is our need to have the differences which

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parate us from out fellows recognized and taken into consideration by those we live and work with, but primarily, by those we work for. If the individual fails to get personal recognition at his work from his boss he will try to get it from someone else away from his work, but get it he will, by hook or crook, for that is his nature. He simply can't help it.

While we have barely scratched the surface of our fact pool I think you will agree that the facts or near facts we have examined, so far, might well be faced.

Doing this, it becomes apparent that with all employees being different, no one ever the same all the time, all hard to change and then only within small limits, and all of them requiring personal recognition to be done and do their best, we may safely conclude that employee relations in any department or industrial institution can never be more or less than *the sum of the person-to-person relationships existing between each and every employee and the company people he deals with.*

Some time ago I had an experience which drove this point home to me. I spent two days working at the molder's bench in the foundry of a friend back in Pennsylvania. This friend knew molding was my hobby and that I had a little grey iron cupola blast furnace at home. When I met him occasionally I had so many questions to ask about molding that to spare himself he finally invited me to work with him for several days.

I'll never forget the morning I reported for work. He called all the boys together and introduced me, explaining that he knew they'd be wondering what I was up to when they saw me hanging around, so he thought he'd better tell them. He said, "Doc Lee told me he needed a rest and thought several days at the molder's bench would kinda' set him up on his feet again. Truth of the matter is he has a little hobby foundry at home. Why in heaven's name anyone would take up molding for a hobby is beyond me, but he did, and here he is to learn something about molding. I'll try to keep him from under foot as much as possible and, in return, I would like your help in pounding a little sand sense into his head, for in spite of his hobby, he's a pretty good egg."

While this foundry had some modern conveniences, several molding machines, vibrators and a motor driven riddle it was small, employing only eighty men—about forty on the day shift and forty on the night. Moulding was pretty much a hand job and largely up to the skill of the individual. Each fellow was more or less on his own and was neither hurried or held back by what the other fellow or his gang did. There was sufficient variety of work to provide many problems—so many, in fact, the foremen spent most of their time in person-to-person contact with their men helping them solve problems they couldn't solve alone. Even my friend, the owner, would occasionally roll up his sleeves and ram up a mold in an effort to help someone with a tough nut to crack.

During my stay I don't think there was an employee, from the boy shaking out castings to the boss himself who did not manage to stop at my bench, kid me about killing the

job, pat me on the back, and without exception show me or help me do what I was so clumsily trying to do. I will have to admit that during those two days my back complained a lot from shoveling all of that sand and lifting those heavy flasks, but I sure did learn a heap about molding and acquired a tremendous respect for anyone who could do it.

However, the most important thing was how quickly I learned to know so many people so well in such a short time. When I left you would have thought I had been with that gang for years, for they all stopped work and the foreman told me my bench and tools would be waiting for me when I got back.

On the way down to the hotel I told the boss he sure had one swell gang. "Oh, they're not so bad, Doc," he replied, "but on the other hand, I don't think they are so much better than the average, even though we are particular as to who we let in here to work with us. The big thing is we all know each other personally so we know how to take each other. In a little town like this with a group the size of ours working together the way we do you can hardly keep from getting pretty well acquainted. I know everybody in the place, most of their families and many of their Dads before them. Over half of the boys have been with me ten years or more. I know the shape they are in, how they are getting along, the troubles they are having, either at home, in town or with their work. You see, Doc, we all look at each other first as people we know, then as molders. And we are proud of our molding. That's why I think we have been able to start with a few benches, grow steadily each year and keep on working, with labor troubles all around us. We have all made a little money as we have gone along, even though we aren't as scientific and efficient as we probably could be."

When I asked my friend what his employee relations system was he said he didn't know as he used any because he took employee relations for granted as the natural consequence of honest people working fairly together at honest work.

In looking back over the foundry I visited and comparing it with our modern mass production setups, with their conveyors, continuous pouring, moulding machines and sand chutes I couldn't help but think how much our shops, tools and methods of doing things have changed since I as a boy watched my granddad work at the molding trade in contrast with how little the people who work in shops have changed.

Then these questions came to mind:

1. Have we in our efforts to get out production and increase efficiency taken personal relations so much for granted as a natural by-product of working together that we have left them to shift for themselves?

2. Is it possible that, without noticing or intending it, the work in our modern shops has become so thoroughly systematized, specialized and mistake proofed that it no longer requires sufficient contact between the individual and his boss to enable them to develop the close personal relationship our facts tell us is the only cure for group relations difficulties?

If the answer to these questions is "yes", then it becomes perfectly obvious that we can no longer depend upon our work to provide the contacts we need for developing satisfactory personal relations. Putting it another way, personal relations can no longer be left to shift for themselves on a hit or miss basis, but must be deliberately planned, provided for, and taken into equal consideration with all the other important factors which enter into the conduct of our business affairs. Either this, or face the prospect of dealing collectively with a group of strangers we cannot understand and who can't or won't understand us, to say nothing of the cost misunderstanding between the two groups is likely to entail.

If our facts have not led us astray, then there doesn't seem to be much prospect of ever finding any new and revolutionary treatment which can be applied effectively to our assortment of widely varying human materials. So it seems that we might just as well step up to the fact that the development and maintenance of a mutually beneficial relationship between employees and management is, at its best, a piecemeal, hand tailored process cut to fit the peculiarities of each and every individual in the group.

As far as I know, there is no law which prevents any supervisor from getting well acquainted with each individual reporting to him and developing a close personal relationship. To my way of thinking, no outside organization can compete with the accumulative effect of such satisfactory personal relationships. When we stop to think that industrial people spend more of their waking hours together than they do with their families or anyone else, then the separation of these closely associated individuals into opposing groups can only mean a lack of facts about people or a disregard of the facts we have and, most assuredly, a wide open field for strengthening our organizations link by link through person-to-person contact and understanding.

As time goes on I am sure that our fact pool will disclose specific treatment, methods, and processes for dealing with our iron, copper and aluminum types of individuals. In the meantime, we can make great gains by recognizing and analyzing the types we have and applying the measures we already know.

I do hope that the few facts we have already discussed will not blind us to another equally important. A mutually beneficial personal relationship between employee and boss does not rest upon any sticky and impracticable sentiment nor on paternalism, unearned concessions, favoritism or the toleration of behavior detrimental to the welfare of the individual or group. Even the humblest individual can tell the difference between handouts and just dues. So with facts personal relations can and should be developed on a he-man shop basis.

There is still one other point our facts suggest. If the vast majority in our employee groups do not possess the qualities required for supervisory work we cannot use prospects for promotion as the sole basis for personal recognition. When we face the fact that some, no matter how hard they

try, cannot measure up to the requirements of a supervisory job together with the fact that room at the top is limited, to say the least, then the prospects of climbing the organization ladder cannot possibly serve as a satisfactory incentive to the vitally important majority. In fact, it is this very majority who feel they must resort to unionism and collective bargaining to gain that which they cannot gain through their own individual efforts.

This being the case, we must begin to measure individual accomplishment on the basis of the extent to which the individual applies the talents he has, no matter how limited they may be. Failure to do this in the past may have had considerable to do with our employee relations difficulties.

It seems to me that we have gone far enough with our fact collecting and fact facing expedition to discover enough facts lying around in our mental stock rooms to put employee relations in industry on a

practical basis. However, I think you will agree that these facts won't help us much unless we face our employee relations with the same impersonal, unbiased and unprejudiced attitude we use so successfully in solving our mechanical and material problems.

If this is the case, then the supervisor of the future cannot afford to have strong personal likes and dislikes; he cannot permit his political, social or religious biases to influence him in dealing with the individual. In other words, he must approach each individual on the basis of what that individual is, how he is put together and what makes him click—instead of *who* he is and what his affiliations are. I think we may accept frequent loss of temper and too long a list of personal enemies as definite proof that that supervisor does not possess what it takes to direct a group of differing individuals under present conditions.

I close with this fact which I unhesitat-

ingly recommend as the foundation for our future employee relations thinking:

Boiled down, the phrase "employee relations" is only another way of saying how employees feel toward management in relation to the way management feels toward employees. A two-way or it can't be a relationship.

While the subject of human emotions is pretty much an uncharted field, we know this much definitely—the fields of good will cannot be bought at any price, for it cannot exist except on the basis of an equal exchange.

Consequently, we cannot legislate good will, contract it or mass produce it into an organization. It's got to be developed through mutual understanding and a respect for the unchangeable characteristics of the individual, together with a respect for the individual's limitations along with his abilities. But, above all, a respect for each person's pride in being an individual.

ELECTROLYTIC POLISHING of Stainless Steel and Other Metals*

By OTTO ZMESKAL

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ANODIC methods of electrolytically cleaning metals have been known for a long time. It was early recognized that when the electrolyte's temperature and concentration were properly regulated bright cleaned surfaces were obtained. However, it was not until 1935, when the original paper of Pierre Jacquet was published (Reference 8 in the Bibliography, page 285), that the subject of electrolytic polishing received the attention of the metallurgical world. It has since been the object of much interest.

Electrolytic polishing of many metals and alloys has been developed by metallographers for preparing specimens for microscopic examination. Its application to some metals, such as aluminum and copper, has been concerned with the obtaining of surfaces with higher reflecting power than those obtained by mechanical polishing. It is in the field of stainless steel, however, that electrolytic polishing has attained industrial importance.

A lustrous finish on stainless steel requires difficult and costly grinding and buffing operations. Electrolytic polishing obtains a mirrorlike finish without the use of any such mechanical methods and at a much lower cost. Mechanical polishing of stainless steel excessively cold works the surface into a highly stressed, partly ferritic condition, in which the metal is flowed and piled into the scratch troughs. Furthermore, particles of abrasive are frequently imbedded—a condition which tends to promote pit corrosion. Because of the poor thermal conductivity and hardness of stainless steel, mechanical polishing heats the surface in a very non-uniform manner.

Electrolytically polished surface layers, on the other hand, are free of stress (or have the same stress as existed in the metal before polishing), are free of foreign particles, contain no ferrite, and have no heat-affected regions. Moreover, the surface is passivated. Such a surface has greater corrosion resistance than has a mechanically polished surface.

Formed articles which are particularly difficult to polish, mechanically, because of inaccessible or depressed areas are easily polished by electrolysis. For example, a complex welded assembly can be

readily polished electrolytically at a fraction of the cost of doing it mechanically.

All types of stainless steels and irons can be polished by the chemical means.

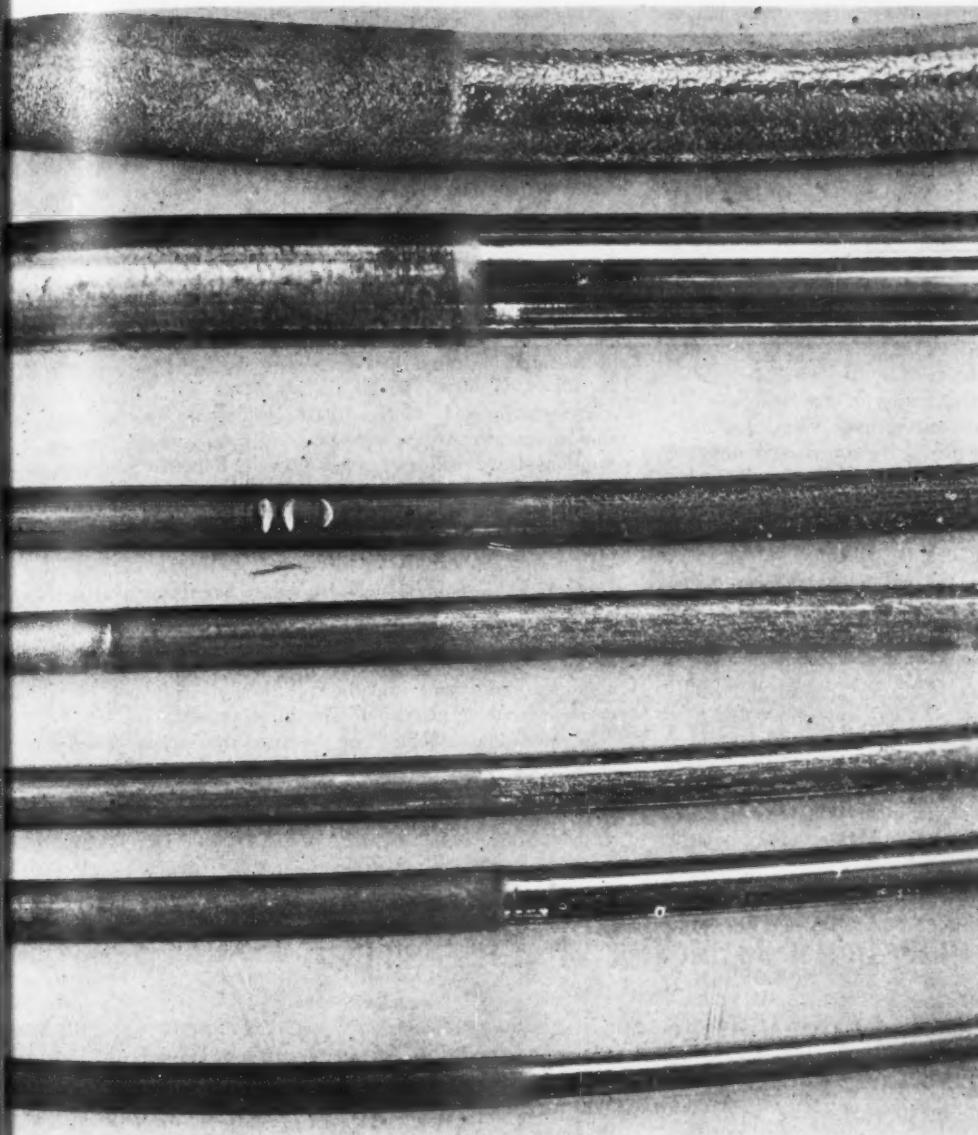
This paper primarily presents the various solutions reported to be satisfactory for the polishing of stainless steel, and discusses some of the variables involved in obtaining a bright surface from anodic action. The literature contains information on useful electrolytes for other metals, and this information is also collected in a supplementary table (page 284).

Essentially, the process consists in making the article to be polished the anode in an acid electrolytic bath capable of forming a soluble salt with the constituent metal. The cathode can be stainless steel, lead, graphite, Duriron, or other conductive, inactive material about 10 to 20 times the size of the anode (the work being polished). Incidentally, where many objects or parts of the same intricate shape are to be polished, conforming cathodes that have the same general shape as the parts should be used. This promotes uniform smoothness down into the recesses.

The current density should be sufficient to form and to maintain a solid oxidation product on the anode (the work), and permit it to have a viscous flow from the surface of the anode. This film is thicker in the troughs of the scratches than it is on the peaks. Consequently, the resistance to dissolution is less at a high point of a scratch than it is at a lower point; the peak dissolves faster and eventually a plane surface is reached.

Since the mechanism removes the high spots there will be necessarily a size loss. Brightening can be obtained with a loss of 0.006 in. from the surface, but a satisfactory polish will generally remove more metal than this—say, from 0.001 to 0.002 in. Another use of electrolytic polishing technique is suggested, and that is the removal of excess surface. When a rod or bar is definitely oversize by a small amount, electrolytic polishing can be satisfactorily used to correct the condition. Furthermore, since the metal dissolves most rapidly at the edges, burrs can be readily removed; this is of especial use, of course, when the burrs are inaccessible to a wheel.

* Reprinted with permission from METAL PROGRESS, April, 1945.



Samples of stainless steel wires; one end of each has been polished or brightened by an electrolytic process.

Two Classes of Solutions

The solutions for electrolytic polishing may be placed in either of two categories. The first is composed of those solutions of low electrical resistance, requiring low voltage of from 4 to 25 volts, wherein control of polishing comes from voltage control. The second includes solutions of high electrical resistance, requiring high voltage of 50 to 220 volts, wherein control of polishing comes from current control.

In the first category are the solutions based upon phosphoric acid and acids such as sulphuric, arsenic, chromic, boric, tartaric, citric, acetic, malic, succinic, and lactic, with or without certain organic addition reagents as glycerol, alcohol, ether, carbitol, methyl cellosolve, ethylene glycol, benzoic acid, picric acid, commercial inhibitors, benzene and toluene sulphonates. These organic addition agents affect the conductivity of the anode film and retard localized pitting.

In the second category are those solutions based upon perchloric acid and organic reagents like acetic acid, acetic anhydride, alcohol, and ether. Solutions in both categories contain small proportions of water to improve the conductivity.

The current density required for polishing varies according to the solution used, in either category, and ranges from a few tenths of an ampere per sq. in. to 30 or even 50 amperes per sq. in. A "critical" value exists below which polishing cannot occur regardless of the time allowed, because the film does not form and the specimen is

etched. Increasing the current density above the critical value for polishing shortens the time required. Because of greater metal loss and lessened chances of pitting, the higher current densities yield more lustrous surfaces. The anode current efficiencies of the solutions range from 25 to 100%. Good polishing solutions have good throwing power.

Those solutions of the first category should be operated hot for best performance, at about 100 to 300° F., depending on the solution. The higher the temperature the higher the current density required. Second category solutions should be operated cold (temperature not exceeding 85° F.). Since the current input will heat the solution, external cooling is necessary. Tanks can be lead lined, or made of stainless steel.

The article to be polished should be totally immersed, as the foaming in some solutions results in a poor polish on that portion within the foam; furthermore, attack on the metal at the solution line is severe. The distance between the anode and the cathode may be from 0.5 to 5.0 in. When the work is coiled (wire or strip) polishing is best done continuously, with the strand being drawn through the polishing solution, wash, and dryer.

Proper surface preparation is a prerequisite for a satisfactory polish. Rough surfaces, however, can be brightened. For metallographic specimens the surface should first be taken down mechanically to the finish produced by No. 0 paper. The smoother the surface is to begin with, the less the polishing time. The use of very high current densities shortens the polishing time markedly.

and also reduces the amount of preparatory surface treatment required.

If wire is to be formed into articles to be subsequently electrolytically polished, skillful draw bench practice must give the wire a smooth and uniform surface. Minor defects that are difficult to detect in the drawn wire and stress irregularities that are impossible to see become quite apparent in the surface after the wire has been electrolytically polished. Any forming operation must be carried out so that no highly localized, highly stressed areas are present. If they are unavoidable it is necessary to remove the stressed surfaces or the stresses before polishing. As a corollary of this, electrolytic polishing affords an excellent inspection method for seams, heavy carbide precipitation, highly stressed areas, and heterogeneity in wire and strip.

In addition to stress effects on the surface, the internal condition of the steel—that is, the size and distribution of the inclusions, and the homogeneity of the structure—affects the final polish. Inclusions are always dissolved out; consequently a specimen electrolytically polished for microscopic examination will appear dirtier than when mechanically polished. Agitation of the solution is not necessary for large scale polishing but it does reduce pitting around the inclusions, and aids in preparing microscope specimens.

Polished surfaces may be streaked by gas bubbles streaming upward. High temperatures, addition agents and agitation will help to avoid this trouble. Agitation increases the anode efficiency and thus the dissolution of the specimen is more rapid in those areas near the greatest turbulence. Consequently, agitation is undesirable when polishing flat surfaces.

Distorted metal at the surface of mechanically polished stainless steel is completely absent when the steel is electrolytically polished. Microscopic examination of an electrolytically polished surface shows no scratch marks, stress bands, or other evidences of a distorted structure. An electrodeposited metal film on an electrolytically

polished and etched specimen of stainless steel has a grain structure that is a continuance of the grain structure of the base metal, while a similar plate on a mechanically polished and etched specimen shows no such structure because it is deposited on the distorted surface layer.

Perchloric acid solutions entail a certain hazard. This hazard, the noxious fuming, and the fact that perchloric acid is a more expensive reagent than phosphoric acid, has caused industry to adopt phosphoric acid solutions almost exclusively for polishing the stainless steels. (There is, however, at least one large installation based on perchloric acid.) Metallographic samples to be polished in perchloric acid should be removed from their plastic, or Wood's metal mounts as these materials form explosive compounds with the reagents. Apparatus for laboratory polishing is described in some detail in each of the following literature references to be found on page 285: 22, 28, 40, 44, 45, 65, 67, 80, 84, 85, 88, 89, 93, 107, 110.

Phosphoric acid solutions have a long life (several years), and can be operated over a wide range of compositions. Any one of the solutions listed will give good results. Patented modifications will brighten an article in shorter times, and in some instances permit brighter surfaces to be obtained than from the simple phosphoric acid solutions in water.

Post-war applications of electrolytic polishing for improving the appearance of stainless steel are many, but the process merits more application now than it is receiving. Correction for oversize burring, removing amorphous layers, scale removal, polishing intricate shapes, preparation for plating, improvement of finish, in addition to the most important feature of increasing the corrosion resistance, are good reasons for this statement.

In the following tables are presented the various solutions recommended for stainless steel and for other metals, along with the source of the recommendations. Apparatus for commercial polishing is described in the following literature references (page 285): 12, 29, 54, 56, 57, 58, 60, 62, 71, 76, 26, 99, 101, 113, 114.

A SURVEY OF SOLUTIONS REPORTED TO BE SATISFACTORY FOR POLISHING STAINLESS STEEL

Part A: Solutions Requiring Low Voltage

(All solutions are given in weight percentages unless otherwise indicated; current in amperes per sq.in.; temperatures in °F.)

SOLUTION		CONDITIONS	REFERENCE
Phosphoric acid	100	1 amp. 100-220° 5 min.	4, 76, 78
Phosphoric acid Water	80	1-12 amp. 100-220° 5 min.	4, 29
	20		
Phosphoric acid Water	75	3 amp. 100-220° 5 min.	4, 25
	25		
Pyrophosphoric acid Alcohol to make 1 liter	400 g.	2 amp. 100-220° 10 min.	42, 47, 85
Sulphuric acid Aqueous solution	75-100	20 amp. 150° 5 min.	1, 2, 38, 76, 78, 112
Chromic acid Water	43	0.4 amp. 100° 1 hr.	6
	57		
Phosphoric acid Sulphuric acid Water	60	5 amp. 175° 3 min.	91
	20		
Phosphoric acid Sulphuric acid Water	65	3.5 amp. 200° 5 min.	76, 113
	15		

SOLUTION	CONDITIONS	REFERENCE
Phosphoric acid	63	0.35 amp.
Sulphuric acid	15	120°
Water	22	1 hr.
Phosphoric acid	30	0.2 amp.
Sulphuric acid	60	120°
Water	10	5 min.
Phosphoric acid	30	1.8 amp.
Sulphuric acid	60	120°
Water	10	2 min.
Phosphoric acid	45	0.5-3.5 amp.
Sulphuric acid	40	85-300°
Water	15	5 min.
Phosphoric acid	14	No current
Sulphuric acid	50	120°
Nitric acid	36	5 min.
Phosphoric acid	63	3 amp.
Sulphuric acid	15	120°
Chromic acid	10	1 hr.
Water	12	
Phosphoric acid	67	3 amp.
Sulphuric acid	20	120°
Chromic acid	4	1 hr.
Water	9	
Phosphoric acid	15	4 amp.
Sulphuric acid	60	120°
Chromic acid	10	30 min.
Water	15	
Phosphoric acid	67	1.7 amp.
Sulphuric acid	20	120°
Chromic acid	2	1 hr.
Water	11	

SOLUTION	CONDITIONS	REFERENCE	SOLUTION	CONDITIONS	REFERENCE		
Phosphoric acid	44	3 amp.	98, 106	Sulphuric acid	10	0.7 amp.	82
Sulphuric acid	40	120°		Arsenic acid	77	140°	
Chromic acid	6	1 hr.		Water	13	60 min.	
Water	10			Sulphuric acid	36	0.3-0.7 amp.	82
Phosphoric acid	13	7 amp.	97	Arsenic acid	47	140°	
Sulphuric acid	16	120°		Water	17	60 min.	
Glycerol	56	5 min.		Sulphuric acid	55	0.5-2 amp.	24
Water	15			Hydrofluoric acid	7	70°	
Phosphoric acid	42	0.1-0.6 amp.	51, 101,	Water	38	0.5-4 min.	
	47	200-300°	104, 75	Sulphuric acid	69	2 amp.	24
Glycerol	11	8-15 min.		Hydrofluoric acid	10	70°	
Water				Hydrogen peroxide	21	5 min.	
(Can also make other organic additions, which are high boiling, soluble in phosphoric acid, and contain one or more hydroxyl groups)				Sulphuric acid	73	3.5 amp.	24
Phosphoric acid	40	0.5 amp.	35	Hydrofluoric acid	13	70°	
Glycerol, tallow, benzoic acid, picric acid, or inhibitors	212°	10 min.		Water	14	5 min.	
Water	50			Sulphuric acid	73	1 amp.	13
Phosphoric acid	50	3-4 amp.	109	Hydrofluoric acid	7	140°	
Sulphuric acid	40	160°		Water	20	5 min.	
Solution A, containing 7 lb. glycine dissolved in 1 gallon hot water	10	2-3 min.		Sulphuric acid	40	Specimen as cathode	39
Phosphoric acid	70	0.7-3.5 amp.	108	Hydrochloric acid	29.5		
Chromic acid	10	100°		Titanium tetrachloride	5.5	170°	
Water	20	5 min.		Nitric acid	0.5	2-5 min.	
Phosphoric acid	60	1.8 amp.	83	Water	24.5		
Arsenic acid	15	120-160°		Sulphuric acid	17	1 amp.	3
Water	20	40 min.		Calcium phosphate, phosphoric acid added	75°		
Sulphuric acid	48	3.5 amp.	35	Sodium sulphate added to saturation		1.5 min. as anode	
Glycerol	32	130°				1.5 min. as cathode	
Water	20	5 min.		Arsenic acid	84	2.5 amp.	83
Sulphuric acid	58	1-2 amp.	52	Chromic acid	10	140°	
Glycerol	20	70-100°		Water	6	10 min.	
Water	22	5 min.		Aqueous acid electrolytic bath containing any of the following ions that form easily soluble salts with the steel: Oxalate, bisulphite, chloride, nitrate, bromide, cyanate, sulphite, acetate, fluoride, iodide, iodide, perchlorate, nitrate, chlorate, thiocyanate, bromate, hydrosulphide, and cyanide.		Current density sufficient to remove solid anodic oxidation products from the surface.	
Sulphuric acid	73	1.5 amp.	74		50-100°		
Glycerol or Toluene sulphonates	20	85°					
Water	7	0.5-5 min.					
Sulphuric acid	50	7 amp.	97				
Glycerol	40	180°					
Water	10	8 min.					
Sulphuric acid	60	14 amp.	97				
Ammoniated-glycyrhizin	0.01	165°					
Methanol	0.55	2 min.					
Water	40						
Sulphuric acid	15	0.5-40 amp.	96				
Citric acid	60	125-250°					
Water	25	0.5-3 min.					
Add 4% of total volume of methyl alcohol, or other alcohols as ethyl, propyl, butyl, glycerol, glycol							
Sulphuric acid	20	0.5-1.5 amp.	56, 62				
Citric acid	55	180-190°					
Water	25	5 min.					
Sulphuric acid	15	0.5-40 amp.	49, 99				
Citric acid	55	120-250°					
Water	30	0.5-3 min.					
Sulphuric acid	10	0.3-0.7 amp.	83				
Arsenic acid	77	140°					
Water	13	20-90 min.					
Sulphuric acid	25	0.3-0.7 amp.	82, 83				
Arsenic acid	69	140°					
Water	6	20-90 min.					

Part B: Solutions Requiring High Voltage

(All solutions are given in *volume* percentages. Current in amperes per sq.in.; temperatures in °F.)

SOLUTION	CONDITIONS	REFERENCE
Perchloric acid	75	2-4 amp.
Water	25	50-85°
		5 min.
Perchloric acid	32	0.4 amp.
Acetic anhydride	64	85° max.
Water	4	5 min.
Perchloric acid	19	0.6-4 amp.
Acetic anhydride	.76	85° max.
Water	5	4-10 min.
Perchloric acid	34	0.5 amp.
Acetic anhydride	66	85° max.
		5 min.
Perchloric acid	20	13-40 amp.
Ethyl alcohol	80	95° max.
		10-15 sec.
Perchloric acid	66	30 amp.
Ethyl alcohol	80	85° max.
Water	14	30 sec.
Nitric acid	34	10 amp.
Methyl alcohol	66	90-100°
		1 min.

A SURVEY OF SOLUTIONS REPORTED TO BE SATISFACTORY

FOR POLISHING SEVERAL METALS AND ALLOYS

Aluminum				SOLUTION	CONDITIONS	REFERENCE	REFERENCE
SOLUTION		CONDITIONS					
Perchloric acid	20 (vol.)	0.2-0.4 amp.		Tempered Steel	Phosphoric acid	50 (vol.)	0.5-1 amp.
Acetic anhydride	80	100° max.		Diethylene glycol	50	120-175°	51
		15 min.		monoethyl ether		15 min.	
Perchloric acid	20 (vol.)	13-26 amp.	72	<i>Electrical Sheet with 3 per cent Silicon</i>			
Ethyl alcohol with 3 per cent ether	80	95° max.		Perchloric acid	33.5 (vol.)	0.4 amp.	34
		8-12 sec.		Glacial acetic acid	66.5	85° max.	
Dilute aqueous solution of fluoboric acid			27, 63			5 min.	
Sodium carbonate or phosphate aqueous solution			16	<i>Hadfield's Manganese</i>			
Chromate or phosphate solution			70	Perchloric acid	18 (vol.)	2 amp.	66
Copper				Acetic anhydride	76	85° max.	
Phosphoric acid	63 (wt.)	0.02-0.05 amp.	8, 10, 84, 61	Water	6	30 sec.	
Water	37	68°		<i>General Application on Steels</i>			
		5 min.		Perchloric acid	10 (vol.)	1.5-2.5 amp.	107
Phosphoric acid	70 (wt.)	0.4-0.5		Glacial acetic acid	90	80°	
Ether	30	or 3-4.5 amp.	5, 10			0.5-2 min.	
		80°		Phosphoric acid	48 (wt.)	5-8 amp.	80
		5-10 min.		Sulphuric acid	40	95-120°	
Pyrophosphoric acid	58 (wt.)	0.5-0.7 amp.	61, 68	Water	12	10 min.	
Water	42	68°		Phosphoric acid	45 (wt.)	3-7 amp.	80
		10-15 min.		Sulphuric acid	39	100°	
Brass				Glycerol	7	5-10 min.	
Chromic acid	16 (wt.)	60-80 amp.	95	Water	9		
Water	84			Phosphoric acid	46 (wt.)	1.5-4.5 amp.	80
Phosphoric acid	70 (wt.)	0.5 amp.	61	Sulphuric acid	40	80-100°	
Water	30	80°		Dextrose	4	5-10 min.	
		5 min.		Water	10		
Lead				Phosphoric acid	65 (wt.)	3-7 amp.	80
Perchloric acid	30 (vol.)	1.3-1.6 amp.	61	Sulphuric acid	15	100-130°	
Glacial acetic acid	70	68°		Chromic acid	5	3-5 min.	
		5 min.		Water	15		
Perchloric acid	24 (vol.)	1-2.5 amp.	61	Phosphoric acid	60 (wt.)	5 amp.	91
Acetic anhydride	67	68°		Sulphuric acid	20	175°	
Water	9	5 min.		Water	20	3 min.	
Perchloric acid	35 (vol.)	0.6-0.7 amp.	61	<i>Tin</i>			
Acetic anhydride	63	68°		Perchloric acid	20 (vol.)	0.6-1 amp.	31
Water	2	5 min.		Acetic anhydride	80	85°	
						8-10 min.	
Nickel				<i>Tungsten</i>			
Sulphuric acid	73 (wt.)	1-3 amp.	37, 52	Caustic soda, aqueous solution, 10%		0.2-0.4 amp.	33, 61
Water	27	80°				68°	
		2 min.				20-30 min.	
Sulphuric acid	70 (wt.)	2-4 amp.	18	Tri-sodium phosphate	160 g.	0.6 amp.	
Water	30	100°; 5 min.		Water	1 l.	100-120°	
Perchloric acid	75 (vol.)	2-4 amp.	5			10 min.	
Glacial acetic acid	25	85°		<i>Zinc</i>			
		5 min.		Caustic potash aqueous 25% solution		1 amp.	23, 61
Steel; Carbon and Alloy						68°	
<i>Annealed</i>						15 min.	
Perchloric acid	18.5 (vol.)	0.3-0.8 amp.	34, 61,	Chromic acid	17 (wt.)	16 amp.	95
Acetic anhydride	76.5	68°	80, 107	Water	83		
Water	5.0	4-5 min.		Chromic acid	7 (wt.)	2 amp.	111
<i>Quenched</i>				Sodium dichromate	22		
Perchloric acid	20 (vol.)	13-32 amp.	72	Sulphuric acid	6		
Ethyl alcohol with 3 per cent ether	80	68°		Acetic acid	7		
		10-15 sec.		Water	58		
Miscellaneous Metals				See the following literature references: 20, 23, 32, 33, 41, 61, 83, 94, 111.			

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Plating of Die Castings on Full Automatic Conveyor*

By H. A. SCHOONOVER

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THE greatest problem in cleaning zinc-base die cast parts, which are buffed on automatic machines, arises from the fact that it is practically impossible to keep large amounts of compound from lodging in the recesses. This occurs to a great extent on grilles and curved parts similar to those plated on the conveyor described in this article.

Solvent degreasing was found to be too expensive for precleaning because the recesses remained filled with grit, after the grease binder was dissolved out. This grit carried out degreaser solvent, which was lost, and had to be removed mechanically, to avoid carrying over into the subsequent plating line the grit, which would cause rough copper and nickel deposits. For this reason, the conveyor was planned to include ample cleaning without use of a de-greaser.

The conveyor itself was a cam transfer type and had 110 hangers. Each hanger carried two large or four small racks. Travel was at the rate of 2 to 3 feet per minute, depending on the specifications for parts being plated. Approximately 10,000 square feet were plated in a twenty hour day. The other four hours were used to change cleaners and acids, drain rinse tanks and rake all tanks for dropped work. There were 30 tanks in the double line and work was racked and unracked on the same end of the conveyor. Heavy parts were racked on hangers and light parts were racked on benches beside the conveyor. The cycle employed is described below.

1. *Soak Cleaner:* 5 minute immersion at 120°F. in a 900 gal. tank containing 5% oleum spirits and 15% proprietary cleaning material. The solution was air agitated and changed once each month.

2. *Dragout:* 15 second dip in a 200 gal. tank, to remove material carried over from the previous operation. This solution was returned to the soak cleaner (1) daily.

3. *Alkaline Cleaner:* 30 second immersion at 205°F. in a 250 gal. tank containing 3 oz./gal. cleaner. Additions were made to this tank at four hour intervals and the solution was changed daily.

4. *Rinse:* This tank contained 1 oz./gal. of alkaline cleaner and was of 50 gal. capacity. Work was given a 15 second dip at 180°F. The solution was changed daily.

5. *Electrolytic Cleaner:* 30 second treatment, as anode at 6 volts and 205°F., in a 300 gal. tank containing 4 oz./gal. of suitable detergent. Additions were made every four hours and the solution was dumped daily.

* A talk delivered to the Los Angeles Branch of the American Electroplaters' Society.

6. *Rinse:* Cold rinse in 300 gal. tank for 30 seconds. Tank was dumped daily.

7. *Rinse:* Same as (6), above.

8. *Acid Dip:* 15 second immersion at room temperature in a 0.2% solution of sulfuric acid. Acid additions were made at four hour intervals and the 200 gal. tank was changed daily.

9. *Rinse:* Cold rinse in 300 gal. tank for 30 seconds. Tank was dumped daily.

10. *Copper Strike:* 30 second strike at 120°F. and 6 volts. The tank held 250 gal. and was changed every month. The solution contained 4 oz. copper cyanide, 5.5 oz. sodium cyanide and 1 oz. soda ash per gallon.

11. *Copper Plate:* 7 minute deposit at 180°F. and 60 amp./sq.ft. in a high speed cyanide copper solution of 1500 gal. capacity. The solution was filtered continuously and mechanically agitated, a deposit of 0.00025" minimum being obtained.

12. *Dragout:* 15 second dip in a 200 gal. tank, to save copper solution. The dragout solution was returned to the copper plating tank (11) daily.

13. *Cyanide Rinse:* 45 second rinse at 180°F. in a solution containing 4 oz./gal. sodium cyanide. The 300 gal. solution was either changed weekly or returned to the copper plating tank (11).

14. *Second Cyanide Rinse:* 45 second rinse at 160°F. in a solution containing 2 oz./gal. sodium cyanide. This tank was also of 300 gallon capacity and was either changed weekly or returned to the first cyanide rinse tank (13).

15. *Rinse:* Cold rinse in 300 gal. tank for 30 seconds. Tank was drained daily.

16. *Acid Dip:* 30 second immersion in a solution containing 0.3% sulfuric acid and 0.3% wetting agent, held at room temperature. The tank held 200 gallons and additions were made at four hour intervals, the solution being changed daily, in addition.

17. *Rinse:* 15 second cold rinse in a 200 gal. tank which was drained daily.

18. *Nickel Plate:* 17 minute deposit at 140°F. and 50 amp./sq.ft. in a bright nickel solution of 3500 gal. capacity, a minimum of 0.0005" thickness of nickel being obtained. This tank, as in the case of the copper tank, was operated with continuous filtration. All additions, however, were made in another tank and were not made directly to the plating solutions.

19. *Dragout:* 30 second dip in a 300 gal. tank to save nickel solution. The dragout solution was returned to the bright nickel tank (18) daily.

20. *Rinse:* 15 second cold rinse in a 200 gal. tank which was drained daily.

21. *Hot Rinse:* 30 second rinse at 180°F. in a 300 gal. tank which was changed daily.

22. *Inspection:* An eight foot inspection section was provided in the plating machine, where one operator examined the racks during the three minute travel time across this space. Approximately 5% maximum had to be removed from the racks for buffing of the deposit.

23. *Electrolytic Cleaner:* 30 second treatment, as cathode at 6 volts and 205°F., in a 250 gal. tank containing 8 oz./gal. of cleaner compound. Additions were made daily and the solution changed weekly.

24. *Rinse:* Cold rinse in 250 gal. tank for 30 seconds, the tank being drained daily.

25. *Acid Dip:* 15 second immersion at room temperature in a 1% solution of hydrofluoric acid. Acid additions were made daily and the solution was changed each week.

26. *Rinse:* Cold rinse in 300 gal. tank for 45 seconds, the tank being drained daily.

27. *Chromium Plate:* 5 minute deposit at 125°F. and 200 amp./sq.ft. in a solution containing 33 oz. chromic acid and 0.33 oz. sulfate per gallon, 7.5 volts being applied across the tank. The tank was of stoneware construction and the solution, comprising 1,000 gallons, was changed monthly.

28. *Dragout:* 15 second dip in a 200 gal. tank, to conserve chromic acid. The dragout solution was returned to the chromium plating tank (27) daily.

29. *Rinse:* 15 second rinse at room temperature in a 200 gal. tank which was drained daily.

30. *Hot Rinse:* 15 second rinse at 200°F. in a 300 gal. hot water tank which was drained daily.

31. *Dry:* A hot and cold blast dryer was employed with a total length of 10 feet, requiring a travel time of 4 minutes. High pressure steam maintained a temperature of 250°F.

32. *Unload and Load:* At the unloading station, 4 operators were employed for racking and another 4 for unracking. Travel time of racks through this station was 4 minutes and articles were inspected before racking and before packing plated work.

Parts requiring painting were transferred to another machine requiring two men for racking and two for painting. Six minutes were required for the paint cycle, which included infrared lamps for drying.

An ampere-hour meter was installed on the bright nickel tank, additions of brightener and acid being determined according to the number of ampere-hours which accumulated. The additions were calculated according to the desired formula and were made daily. These additions were made continuously to an outside tank, from which the filter pumped into the main tank through three long pipes in the bottom of the plating tank. The nickel solution

(Concluded on page 305)

ORANGES VS. STEEL

By MARCUS D. RYNKOFFS

Member of the Los Angeles Branch, A. E. S.

THE Los Angeles Branch members of the American Electroplaters' Society, wives and friends accepted an invitation to visit the Kaiser Steel plant, located at Fontana, some 55 miles from Los Angeles, Friday afternoon on April 27th.

The trip was made with some 40 automobiles, supplied by the members of the Society, carrying over 200 platers and friends through the eastern part of the city, thence through the orange blossom scented orchards plus the outstanding war housing communities set a new all-time high record in attendance of a single plant visit by the members of this branch. Owing to strict war time regulations and censorship, no cameras were allowed and minute details of capacity production were forbidden.

Fantastic in its magnitude and scenery within the orange grove belt and the exquisite background snow capped mountains, from which train loads of iron ore are hauled to the plant's melting pots, one of the largest in the country, is a reality in California, where steel is made on the spot where oranges were grown only a few years ago, hard as that is to believe.

A jam-packed cafeteria on the grounds of the steel manufacturing plant, where the anxious visitors congregated for the orange scented dinner, had a wide choice of entrees along with all its respective trimmings.

This large crowd of visitors is still spreading the news of the sights following the night's gala inspection of the huge steel plant.

Many of the visitors who hail from Detroit,

Gary, Chicago, Pittsburgh and Homestead where steel manufacturing has been king for years, could not believe their own eyes to see the impossible made possible, here in the heart of the citrus and walnut industry.

Starting with the arrival of ore from the adjacent mountains and coal from Utah and ending with the heavy steel ship plates for the tremendous ship construction program, which is contributing its share in winning the peace, the 200 auto-borne visitors were divided into five groups of ten cars each, the largest and most ambitious group to make the plant inspection. But easily the smash hits of the evening were the sights of the 1,200 ton capacity blast furnace, 110 foot high preheating stoves and the open hearth furnaces cooking up its mixture only to be



General night view of Kaiser Company, Inc. steel plant near Fontana, California, taken from a rolling mill building, this picture shows at left sister plant and by-products area; 1200-ton capacity blast furnace in center background; ingot stripper building right center; and open hearth building in right background. The six 185-ton open hearths are in operation 24 hours a day producing steel for ship plates and shells.



Train load of hot metal ladle cars have just been loaded at blast furnace and will be transferred to open hearth furnaces or pig casting machine. Big cloud of steam at left is from coke quenching.

soured into moulds on steel cars drawn by Diesel driven engines to the next point of operation. This left the visitors gasping with its magic "liquid" in their minds.

By special arrangement, Mr. Harry Beyma, representative of the company, headed the guides who led the caravans over paved walkways to the coal cooking ovens from which ten tons of coke were mechanically ejected every eight hours after the important volatile products were extracted. This is to be compared to five tons and 48 hours in each of the old bee-hive ovens throughout Greensburg, Latrobe, Whitney, Lippincott, Connellsville and other Western Pennsylvania coke producing centers, where all the volatile products were allowed to go to waste.

At this scene of operation we saw coke ejected from its 2,400 degree cooking chambers or retorts into a waiting steel car which was driven to the quenching quarters, thence dumped into an underground conveyor which then takes its load to an overhead storage bin, only to be fed into the blast furnace in melting the ore.

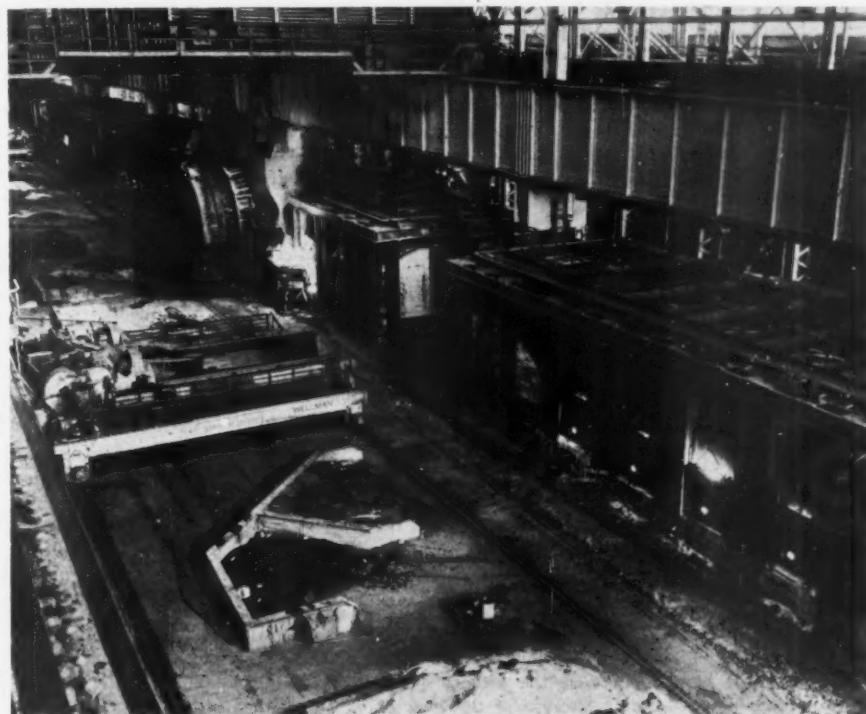
The caravans transversing a few miles in roundabout way to the blast furnace approximately 110 feet high, we watched operators carefully weigh quantities of ore, coke and limestone for flux; this mixture was then carried to the top of the furnace by means of a car running on an inclined track. Molten iron is hereby produced in a molten state, poured into fire-brick-lined ladles mounted on steel cars and moved to the adjacent open

hearth furnaces and alloyed with carbon and its component elements to produce a fine grade of steel. This production of steel ingots weighing about five tons each was the result of this continuous operation which could be plainly viewed from a vantage point on a visitors' platform about 100 feet above ground level, overlooking the battery of six open hearth furnaces, capable of a daily production of 185 tons each.

Our crowd seemed to be amazed to watch the train of cars haul the five ton red hot ingots a few thousand feet to the fire-brick-lined pits into which the overhead crane with its long pincer-like arms would lower the ingots to be kept red hot, then drawn out and placed precisely upon a roller track, apparently electrically driven to the huge rolling mill. This rolling mill or flattening out process continued through roughing and finishing mills until the final steel plate, 1" x 96" x 500" was fabricated. After the fabrication process, the plates were shifted over smaller rollers, electrically driven also, and likewise controlled, only to be cooled and then shifted to the shearing units.

Thus the steel plates were loaded on cars and shipped to the company's own shipyards where Kaiser builds ships on the Pacific Coast.

Viewing this final and prior operations will linger long in the minds of this group of platers who were so fortunate as to accept the invitation to visit Henry Kaiser's contribution to the war effort.



Charging one of the six, 185-ton open hearth furnaces with molten iron at plant of Kaiser Company, Inc., Iron & Steel Division. The steel made in these furnaces goes into ship plate and shell manufacture today, but is destined for the industrial development of the West in the days of peace to come.



THIS IS WASHINGTON—

By George W. Grupp
METAL FINISHING's Washington Correspondent



Washington Experts Take a Look At the Future

and less hit and miss type of plating which will be left to the decorative field of metal finishing. To meet the demands of precision plating many plants are expected to install a lot of new equipment to replace the war worn facilities. More chemists and metallurgists will be entering the plating business because the industry now realizes the value of such highly trained men in their establishments. And it is also the opinion of the Capital's experts that cadmium plating may give zinc plating some stiff competition in the post-war period. They believe that platers should prepare themselves to plate on glass, plastics and other materials.

Handbook on Wage Incentive Plans Issued By WPB

"Incentive Plans" which can be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for ten cents a copy. In the introduction of this pamphlet, Chairman J. A. Krug states that the use of wage incentive plans were responsible for a "fourfold increase in monthly war production which took place during the 3 year period between December 1941 and December 1944." This valuable handbook treats on such subjects as (1) the development of wage incentive plans; (2) the reasons for wage incentive plans; (3) types of wage incentive payment plans; (4) incentive wages for indirect workers; (5) the guiding principles of wage incentive plans; (6) the pitfalls of an improperly designed wage incentive plan, and (7) many mathematical formulas to determine the relationship between wages, productivity and costs, and the relationships between wage incentive lines.

What Is a New Order? Interpretation No. 10 to Controlled Materials Plan Regulation No. 1, issued on June 7, 1945, defines what is a new order in case a customer having placed an authorized controlled materials order with a producer wishes to make changes in that order. The interpretation points out that in no case does a change of shipping destination constitute the placing of a new order. The elements of a new order are (1) an increase in the total amount ordered; (2) an advancement or deferment of delivery when made by a customer, and (3) instruction to a producer by a customer to reinstate a suspended order.

Commerce Department To Help Small Business

concerned, it may be because the owners of venture capital hesitate to advance funds because of the lack of experienced or trained management, taxes which discourage enterprise, and certain competitive advantages which appear to be inherent in large scale operations in some industries and trades." The report recommends that a "large number of specialized studies and reports" should be prepared by the Commerce Department "which will be of direct and immediate aid to small business." These studies are to deal with (1) operating functions; (2) business cooperation; (3) distribution costing methods; (4) competition; (5) finance and credit, and a myriad of other things vital to the successful operation of a small business.

How to Get Plating and Anodizing Equipment

Because of the confusion which has crept into the minds of some members of the metal finishing industry due to the wholesale revoking of "L" and "M" orders by the WPB, it might be well to point out that priorities and ratings for electroplating and anodizing equipment are issued to prime and sub-contractors upon making application on Form WPB-542 provided the equipment is needed to perform work for the armed services. Platers who require equipment to care for their essential civilian work must continue to apply on Form WPB-541. Those platers who need equipment for neither military or civilian essential work should apply under PR-24; or they may place unrated orders with their suppliers for delivery after the revocation of Order L-123, and in accordance with Interpretation No. 11 to PR-1. When platers need new buildings or facilities they should apply on Form WPB-617 under PR-24. Applications for equipment under PR-24 for reconversion purposes should be made on Form WPB-1319; and in Block 6 of that form they should give the number of the WPB order, such as L-123, and mention the term "Priorities Regulation 24." If this latter type of application is approved it will be given a rating of AA-3. All platers should file their applications at the nearest WPB office for screening and processing, provided the value of the equipment is not in excess of \$25,000. It should also be added that after July 1st platers and manufacturers of plating equipment will be able to buy "controlled materials" as in peacetime provided the materials are available and can be found; but under no circumstances, according to CMP-1 are persons to possess an inventory in excess of sixty days' requirements.

No Supplementary Allocations for Third Quarter of 1945

For the purpose of weaning civilian industry away from a dependence on Government allocations the War Production Board is urging the usage of freed materials released by war production cutbacks. The Board has no intention of granting supplemental allocations of controlled materials, except in extremely urgent cases, during the third quarter of 1945. This means that the production of civilian items above the levels already approved for the third quarter will have to be made without priorities assistance and with materials bought in the "free" market.

Manufacturers Urged To Return Allotments

Manufacturers were invited to assume their full responsibility to speed reconversion in the issuance of Interpretation No. 31 to Controlled Materials Plan Regulation No. 1 on June 8, 1945. According to this interpretation it is necessary that ratings and authorized controlled materials orders which are no longer needed for their original purpose should be promptly cancelled in order to open up suppliers' order boards. The WPB warned industry that it will not relax many of its remaining controls until it can be sure of the existence of substantial supplies that will flow without ratings.

Contract Settlement Office Issues Two Regulations to Speed Up Settlements

Director Robert H. Hinckley of the Office of Contract Settlement, issued two regulations on May 28, 1945, to aid in speeding up and improving contract settlements. Regulation No. 16 deals with a program for limited company-wide settlement of termination claims. In commenting on this regulation Mr. Hinckley said: "This office is convinced that a program of company-wide settlement applied to a limited number of cases will be of great value in speeding payments to companies com-

ing under the program and the large number of subcontractors who deal with them. Application of this procedure will minimize duplication of effort in processing claims, excessive paper work, lack of uniform treatment from various customers, and slow payment of claims." Regulation No. 17 deals with the protection of termination claims of subcontractors, especially against insolvency of higher tier contractors. It permits subcontractors to make application to contracting agencies for direct payment or settlement of their claims in cases where their customers are, or are in danger of becoming insolvent.

Construction Restrictions Eased a Bit

Schedule A to Controlled Materials Plan Regulation 6 was amended on June 4, 1945, to eliminate the restrictions on the use of steel, copper and electrical materials in construction work. Restrictions, however, on the use of tin, lead and zinc have been retained.

Civilians Must Patch Their Metal Screens

The War Production Board has urged householders to patch and repair their metal insect screening. And until the restrictions of Order L-303 are lifted the metal finishing industry will not have much business galvanizing metal screening for civilian uses. In fact, the order was amended on June 1, 1945, to make certain that the limited amount available for civilians is used for the most urgent and essential needs.

Commercial Construction Restrictions Eased

The War Production Board announced on June 11, 1945, in Direction No. 5 to Construction Order L-41 that a little more leeway will be given to construction projects for starting or resuming civilian production or services. The direction sets up three categories of construction projects with criteria that must be satisfied within each category before authorization is granted. Applications are still filed on Form WPB-617 and, in general, AA-3 preference ratings are assigned to approved projects.

Priorities Regulation No. 3 Clarified

The recently issued Interpretation 15 to Priorities Regulation No. 3, makes it clear that the revocation of a limitation order affecting an item on either List A or List B does not in any way affect the restrictions imposed by PR-3 for either list. Each item on the lists, even though reference is made for definition of the items to an order now revoked, is still subject to the same definition.

Alien Property Custodian Issues Licenses On Many Patents

Alien Property Custodian James E. Markham recently reported to President Truman that as of March 31, 1945, the net value of enemy property vested in his office amounted to \$232,000,000. This amount does not include the value of 46,000 patents, 200,000 copyrights and more than 400 trademarks. The report says that as of June 30, 1944, the Office of Alien Property Custodian issued licenses covering 5,853 different patents and patent applications.

Wage Controls Will Continue Until Defeat of Japan

The War Labor Board's reconversion wage policy makes it clear that all wage controls shall continue until after the fall of Japan. And they will be dropped gradually and not abruptly with the defeat of the Japanese. It appears that the rates on key jobs will not be changed. When a firm changes its line of production, from war products to peace products, the WLB will insist that the prevailing level in the industry or area for comparable occupations must be followed. On the other hand if the job content remains the same the rates are to be unchanged.

Civilian Production Only Curbed By Availability of Materials

Relaxation of certain War Production Board controls enable one to place orders for controlled materials, except stainless steel, for any amount for delivery after July 1, 1945, without using an allotment or allotment symbol. One can now buy idle and excess controlled materials without any authorization from WPB. It is no longer necessary to file Form WPB-3820

with a CMP-4B application if an establishment falls in Group 3, Group 4, or in an unclassified labor area. Anyone may now start or resume civilian production provided he can get the materials; and he is permitted a minimum of 30 days' inventory. One can produce without limit if one can find the material.

Preference Ratings Will Not Be Made On PR-25

The War Production Board announced, on June 12, 1945, that field offices have been instructed not to assign preference ratings, or make allotments of controlled materials under Priorities Regulation No. 25 beyond July 1, 1945. It was also announced that field offices will authorize no production schedules for the third and fourth quarters of 1945 except for products governed by current orders listed in Direction 1 to PR-25.

Reports May Be Required Even Though an Order Has Been Revoked

The War Production Board amended Priorities Regulation No. 8 on May 29, 1945, for the purpose of requiring reports, whenever it sees fit, from producers and suppliers and consumers, even though an order or regulation has been revoked which covers a specific commodity or service. Upon written notice the Board may require a report in the form of (a) a letter or other written instrument, and (b) a report form or instruction sheet bearing an official WPB number.

Public Register of Available Patents for Licensing Will Be Established

Secretary of Commerce Wallace recently announced that a public register of patents available for licensing will be established in the Patent Office to aid manufacturers in finding new products for manufacture during the reconversion period and post-war period. Patents on the register will be classified according to types of inventions to permit ready appraisal and selection by manufacturers. The register will be under the supervision of the Commissioner of Patents.

Limitation Order L-123 Was Revoked

Limitation Order L-123, which controlled the production and distribution of such industrial equipment as electrical motors and generators, fans and blowers, heat exchangers, industrial drying, curing and finish-baking ovens, and electroplating and anodizing equipment, was revoked by the War Production Board on June 2, 1945. While unrated orders may now be placed with suppliers for these metal finishing products that does not mean that deliveries will be made immediately because the Control Materials Plan still controls the availability of the raw materials needed to make those devices.

Aluminum Household Ware Order Revoked On May 30, 1945, the War Production Board revoked Limitation Order L-30-e which controlled the production of aluminum cooking utensils, kitchenware, and household articles.

Aluminum May Be Exchanged for Copper

Following the revocation of Order M-9-c on June 11, 1945, the War Production Board announced that slide fasteners, hooks and eyes, snaps, buckles and kindred closure items that have been made from steel and aluminum since the attack on Pearl Harbor may now be made from copper base alloy. Since June 23rd the Office of Civilian Requirements has acted as a metals banker. It will accept steel already allocated to manufacturers of CMP Code 662 items in exchange for the more desired copper base alloy on a pound-for-pound basis. Aluminum will be exchanged on the basis of three pounds of copper for each pound of aluminum. To participate in this exchange Form CMP 32 should be used in returning aluminum or steel; and Form CMP 4B should be used in making application for copper base alloy.

Brass Mill Products "Open-Ended"

Because supplies of brass mill products have been made available through contract cancellations and cutbacks, the War Production Board on May 28, 1945, issued amendments to CMP Regulations 1 and 4 in order to permit any

person to place unrated orders for immediate delivery of brass mill products. In other words brass mill products were open-ended before July first.

Cobalt Order Revoked In an effort to relax restrictions as quickly as possible the War Production Board on June 8, 1945, revoked Cobalt Order M-59. This revocation was possible because of increased shipments of the metals from Belgian Congo and other points.

Cutlery Plating Supplies Scarce

Members of six cutlery industry advisory committees at a joint meeting held in June were told by representatives of the War Production Board that pocket knives for the average civilian will continue to be scarce perhaps for the balance of 1945. They were informed that the supply of lead is tight; the supply of tin is critical; and that the supplies of chromic acid, copper, brass and stainless steel are expected to be ample to take care of the third quarter requirements. Nickel was reported to be the scarcest material needed by the cutlery industry, with the result that nickel plating of cutlery will not be possible except for surgical instruments.

Electroplaters Wanted By Army and Navy

Recently the War Manpower Commission issued a booklet entitled "Guide to Foreign Employment Opportunities." This booklet lists all private and Federal agencies which are recruiting workers for jobs outside of continental United States. In this booklet it was observed that electroplaters are wanted by the War Department at Fort Richardson. The Navy Department is in need of electroplaters at Pearl Harbor. For further information about these jobs letters should be addressed to the Labor Recruitment & Transportation Section, War Manpower Commission, Room 512, 1778 Pennsylvania Avenue, N. W., Washington, D. C.

Value of Electroplating Preference Ratings

During the period of April 1st through May 26, 1945, the number and value of applications for construction and equipment on which preference ratings were authorized under PR-24 and L-41, Direction 5, are as follows: Silverware, Plated ware, 4 applications under PR-24 valued at \$51,000; Electroplating, 6 applications under PR-24 valued at \$33,000; Electroplating, 2 applications under Direction 5 L-41 valued at \$151,000.

Molybdenum Restrictions Eased

The War Production Board revoked Order M-110 which required reports on monthly sales of molybdenum over 2,000 pounds. Molybdenum reports, however, will continue to be required under Order M-21.

No Nickel and Chromium Available For Civilian Refrigerators

Officials of the War Production Board told members of the Pressed Metal Products Industry Advisory Committee at their June meeting that there is an adequate supply of brass and aluminum with some additional improvements expected; and that no nickel and chromium are available for decorative purposes in civilian products.

Plating Supplies for Civilian Use Is Critical Board report that chromium plated tubular furniture for civilians is expected to be as scarce for the remainder of 1945 as it was before the collapse of Germany. The supplies of cadmium, chromium and nickel are so critical that unless severe cutbacks occur none will be available for civilian plating.

Plumbing Fixture Schedule Revoked

Restrictions on the use of metal in the manufacture of plumbing fixtures were removed by the revocation of Schedule XII of Order L-42. However, manufacturers and dis-

tributors are still controlled by all other applicable WPB orders and regulations.

Domestic Silver

Restrictions Eliminated All controls on the use of domestic silver were lifted by amending Conservation Order M-199 on May 26, 1945. Restrictions on the use of foreign silver is still effective. In making this amendment Interpretations 1 and 2, Directions 1, 2 and 3 and Amendment 1 to this order were revoked. When the amended order was released WPB officials pointed out that the supply of semi-fabricated silver, particularly in wire and sheet form, is very tight and that persons who desire to buy silver may have difficulty in obtaining the metal for some time.

Enameling Ware Production Restrictions Revoked

The production of enamel ware for civilian consumption now only depends on the availability of materials, facilities and manpower because Limitation Order L-30-b was revoked on May 26, 1945. It will not be long now for enameled cooking ware, pails, buckets, tubs, infants' bathtubs, dish pans, sink strainers, baby bottle sterilizers, enameled cabinets, commodes and a myriad of other enameled ware to find their way on the shelves of merchants.

Sodium Metasilicate Now Under Schedule 106 of M-300

Sodium metasilicate was placed under allocation of Schedule 106 of Order M-300 on May 19, 1945. According to the schedule, allocations of sodium metasilicate have been made at bi-monthly intervals since June first.

Revoking Zinc Order Merely a "Hunter's License"

The effect of the War Production Board's revocation of Order M-11-b on June 14, 1945, merely gives prospective buyers a sort of "hunter's license" to find the zinc for the supply continues to be tight.

Zinc Allotment Increased

Under Direction 1 to Order M-11-b an additional 20 per cent of the amount of zinc used during the fourth quarter of 1944, may now be used for applying a protective coating, or plating other than paint, on products not on List A.

Stearic Acid Restrictions Eased

Since June, users of stearic acid for essential purposes have been required to place priority orders with suppliers by the first of the month instead of the sixteenth of the month. Small users and distributors of stearic acid are now authorized to have inventories up to 200 pounds. These changes were authorized in Amendment No. 1 to WFO-129.

Porcelain Enameling Products Shipments Increasing

The Department of Commerce's Census Department reports that the value of shipments of porcelain enameled products during the month of April, 1945, amounted to \$3,146,268 as compared with \$3,206,987 in March, 1945, with \$2,753,885 in April, 1944, and with \$2,604,791 in April, 1943.

Enameling Ware Production Will Not Expand

The continuing difficulty of obtaining light-gauge steel sheets will prevent appreciable increases in enameling ware production for some time, in spite of the revocation of Order L-30-b. War Production Board representatives recently told members of the Porcelain Enameling Utensil Industry Advisory Committee that steel sheets of the types and quantity needed by the industry are expected to be available only in sufficient quantity to fill orders against allotments under the Control Materials Plan in the third quarter of 1945.

Patents

Rust Preventive Base

U. S. Pat. 2,374,565. H. Roden, assignor by mesne assignments, to The Texas Co., April 24, 1945. A non-drying rust preventive base comprising the following formula:

	Per cent
Petrolatum (140-150° F. M. P.)	50-70
Petrolatum (150-165° F. M. P.)	0-15
Cylinder stock	10-25
Viscous pale oil	5-15
Wool fat	1-8
Heavy metal salt of a high molecular weight fatty acid	0.4-1.0
Alkyl ester of a high molecular weight fatty acid	1-5

Stainless Steel Printing Plate

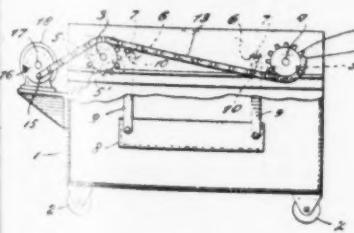
U. S. Pat. 2,375,210. C. Batcheller, May 8, 1945. A printing master comprising a plate of chromium-containing alloy steel provided on the printing face thereof with an electrolytic grain and having an image forming substance superposed on predetermined zones of said face.

Abrasive Wheel

U. S. Pat. 2,375,263. F. A. Upper, assignor to The Carborundum Co., May 8, 1945. The method of making bonded abrasive articles from a plurality of superimposed layers of abrasive-included, felted, fibrous sheet material which comprises assembling a number of sheets of previously sized abrasive-included fibrous web material in superimposed relation, subjecting said assembled sheets to an initial consolidating action to form therefrom a compressed slab of the desired thickness, cutting out pieces of the desired size and shape from the said compressed slabs, and further consolidating said cut out pieces of compressed slab material to form abrasive articles of the desired thickness.

Cleaning Machine

U. S. Pat. 2,375,723. M. J. Zinty, assignor to Magnus Chem. Co., Inc., May 8, 1945. In a washing machine the combination with a tank, of a basket therein, hanger members upstanding from the corners of the basket and pivotally connected thereto, a cross bar extending transversely above each end of the basket and each uniting a pair of hanger members, two transverse, horizontally disposed rock shafts journaled in the side walls of the tank beyond the ends of the basket, a pair of inwardly projecting supporting arms mounted on each rock shaft and having upwardly opening recesses to receive and removably support said cross bars, means



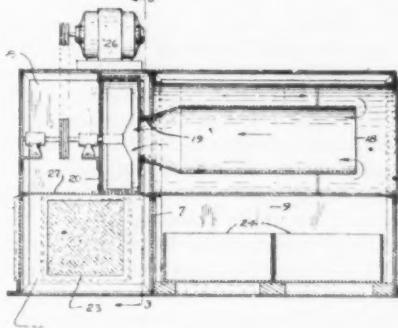
mounted on the outside of the tank for oscillating one of the rock shafts, and cross-connections therefrom to the other rock shaft to oscillate the same in synchronism with the first rock shaft to impart a vertical reciprocating motion to the basket through said supporting arms.

Electropolishing Aluminum

U. S. Pat. 2,375,394. M. Tosterud, assignor to Aluminum Co. of America, May 8, 1945. The method of electrolytically brightening an aluminum-silicon alloy surface, the alloy containing from about 2 to 20 per cent by weight of silicon, which comprises making said surface an anode in an electrolyte consisting of about 2 to about 50 per cent by weight of HF, about 5 to about 75 per cent by weight of glycerine, and not less than about 10 per cent by weight of water, and maintaining a current density from about 50 amperes per square foot to about 450 amperes per square foot until the desired brightening is attained.

Dust Collector

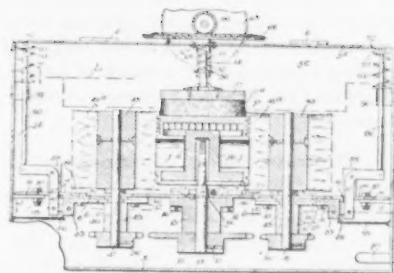
U. S. Pat. 2,375,608. G. H. Young, assignor to B. F. Sturtevant Co., May 8, 1945. In a dust collector having substantially horizontal upper and lower walls and substantially vertical side and end walls; a substantially



horizontal cylinder extending longitudinally in the upper portion of said collector, said cylinder having an air inlet with means for spinning the air entering same, and having a tangential skimming channel in its lower wall; a smaller cylinder arranged substantially concentrically within said horizontal cylinder; a dust collection chamber below said cylinders; a centrifugal fan in said collector adjacent one end wall thereof, said fan having an axial, cylindrical inlet connected to said smaller cylinder, and having a tangential outlet, the combination of a substantially vertical partition extending from said upper wall to said lower wall of said collector between said horizontal cylinder and said collection chamber and said fan, said axial inlet of said fan extending through said partition; a substantially horizontal partition extending between said one end wall and said vertical partition below said fan, said outlet extending through said horizontal partition, said one end wall having an opening therein between said horizontal partition and said lower wall of said collector, and an air filler in said opening.

Cleaning Machine

U. S. Pat. 2,376,945. C. A. Stine, assignor to Turco Products, Inc., May 29, 1945. Clean-



ing apparatus comprising, in combination, a tank adapted to hold a cleaning solution, a cover lid swingably mounted on the tank, a work holder rotatably mounted in the tank, a journal member mounted in the tank for lateral sliding movement relative to the work holder, a brush shaft journaled in the journal member for rotation about an axis parallel to the axis of rotation of the work holder, a brush mounted axially on the shaft, means responsive to swinging movement of the cover lid to slide the journal member, and means for rotating the work holder and shaft.

Hot Dipping Copper

U. S. Pat. 2,375,434. B. C. Moise and B. C. Moise, Jr., May 8, 1945. In an organized apparatus for copper coating sheet-like ferrous materials in strip form, a furnace chamber, means for flowing molten copper into said chamber to form a molten bath therein, roll stands on opposite sides of said chamber for propelling a ferrous metal strip through said chamber, means for positively driving said roll stands in synchronism, a cooling chamber between said furnace chamber and the roll stand on the entrance side of said chamber and through which said strip passes, and a temperature reducing chamber located between the outlet of said furnace and the roll stand on the outlet side thereof and through which said strip passes; the construction and arrangement being such that said cooling chamber prevents furnace temperature from reaching the roll stand on the inlet side of said furnace chamber.

Polishing Plastics

U. S. Pat. 2,375,825. A. Saunders and L. S. Engle, assignors to Interchemical Corp., May 15, 1945. A polishing composition characterized by its ability to produce a haze-free, glossy surface on non-thermoplastic resinous finishes, which comprises a vehicle containing essentially a liquid polyhydric alcohol of the group consisting of glycerol and ethylene glycol, and a polishing abrasive dispersed in the liquid consisting essentially of a hydrated calcium silicate powder containing about 18% by weight CaO, 64% by weight SiO₂ and 14% by weight chemically combined water.

Buffing Wheel

U. S. Pat. 2,376,053. E. W. Hall and A. S. Rock, assignors to F. L. & J. C. Codman Co., May 15, 1945. A rotary abrading tool comprising, in combination, a hub, and a continuous strip of abrading material constituting an uninterrupted band wound spirally about and continually receding from the axle of said hub, thus presenting a laminated

ring, the laminations being provided with a series of sets of registering openings forming passages radially through said ring, said hub being provided with a series of projections extending radially outward through said passages.

Electropolishing Aluminum

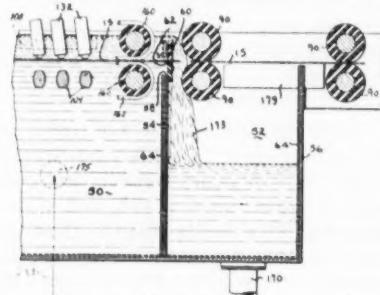
U. S. Pat. 2,376,082. A. N. Pullen (England), assignor, by mesne assignments, to Aluminum Co. of America, May 15, 1945. The process of producing a highly reflective surface on aluminum and aluminum alloy articles which comprises brightening and oxidizing said surface by anodic treatment in a hot alkaline brightening electrolyte, subjecting said brightened surface to further anodic treatment in an acid electrolyte adapted to produce an aluminum oxide film on the brightened surface, heating the article in water maintained at a temperature not substantially below 65° C., and thereafter immersing the article in an aqueous bath containing about 5-10 per cent of an acid selected from the group consisting of sulfuric acid, hydrochloric acid, and nitric acid, together with a soluble aluminum salt and a soluble fluoride, for a period of about 2 to 20 minutes, in order to selectively remove the oxide film produced in the brightening treatment.

Bright Dipping Cadmium and Zinc

U. S. Pat. 2,376,158. R. H. McCarroll, J. L. McCloud and H. E. Hanson, assignors to Ford Motor Co., May 15, 1945. A method for the surface treatment of metals selected from the group consisting of zinc and cadmium to produce a high lustre durability and a surface capable of being painted, comprising, the step of immersing the metal in an aqueous bath containing as essential elements about 120 gr. chromic acid per liter, about 0.25 to 0.50 gr. sulphuric acid per liter and about 0.8 to 1.2 gr. nitric acid per liter, the ratio of said chromic acid to the combined amount of the sulphuric and nitric acids being approximately 100 to 1.

Electroplating Sheets

U. S. Pat. 2,377,550. W. F. Hall, assignor to Hanson-Van Winkle-Munning Co., June 5, 1945. An electroplating unit for continuously treating metal sheets comprising an elongated compartment containing electrolyte and means for submerging and moving the sheet in the electrolyte, and containing anode and cathode means, means to cause the electrolyte to flow under and over the said metal sheets as they leave the compartment, comprising the following: said compartment having high end walls, a horizontally arranged slit located below the top of



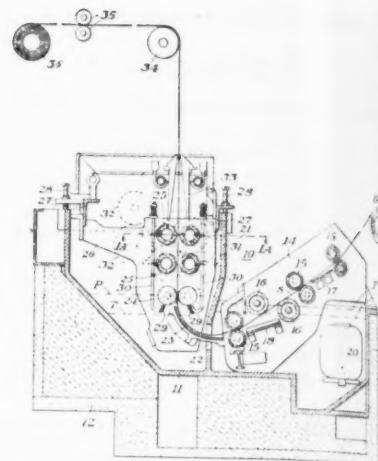
one of said end walls through which said sheets may be fed and thus be kept in constant contact with the electrolyte on all sides on their entire way through said compartment, and an overflow compartment located in juxtaposition to said elongated compartment and having in common with said elongated compartment said slit end wall, said end wall being of less height at a point above said slit than the other walls of said compartment whereby the top portion of a sheet being fed through said slit will have electrolyte cascaded thereon, roller mechanism located adjacent said end wall, said overflow compartment having another wall of less height than said slit end wall, over which said sheets are guided by said roller mechanism, a drain in said overflow compartment, conduit means and a pump connection from said drain to said elongated compartment, whereby fluid which flows over the top of said slit end wall spreads over said sheets and is pumped from said end compartment back to said elongated compartment, means at the lower part of one of said side walls of said elongated compartment for receiving said pump connection, said pump maintaining the level of fluid in said overflow compartment below the level of said metal sheets and said other wall of said overflow compartment.

Drier

U. S. Pat. 2,376,174. A. P. Munning and W. J. Winward, assignors to Munning & Munning, Inc., May 15, 1945. A drier comprising a rectangular longitudinally elongated drying chamber and at least one rectangular longitudinally elongated circulating chamber parallel thereto said chambers being open exclusively at their respective tops over substantially the entire horizontal areas of said chambers, a rectangular longitudinally elongated displaceable cover normally closing said open tops of said chambers, said cover including a rectangular longitudinally elongated bridge element spanning the open top of said drying chamber and dividing the interior of said cover into a compartment communicating with said drying chamber and a channel communicating with said circulating chamber, an impeller rotatably mounted in an opening formed in said bridge element for effecting circulation of a gaseous medium through said opening between said channel and said compartment, transversely extending rails projecting laterally beyond one side of said drier for supporting said cover for lateral horizontal movement from its drier closing position to a position exposing the open top of the drying chamber, means for shifting said cover horizontally along said rails out of and into covering relation with respect to the open tops of said chambers, and means automatically controlled by said cover in shifting for stopping and starting rotation of said impeller in accordance with the uncovering and recovering movements of said cover.

Hot Dipping Apparatus

U. S. Pat. 2,377,632. J. D. Keller, assignor to The Wean Engineering Co., Inc., June 5, 1945. Apparatus for coating strip comprising a container for holding a coating bath, means for feeding strip through said bath, a



pair of rolls between which the strip passes on emerging from the bath, said rolls being permeable, and means supplying wiping fluid to the interior of the rolls for radial flow therefrom onto said strip.

In a method of coating strip, the steps including applying a coating fluid to the strip, wiping off the surplus coating fluid by forcing wiping fluid under pressure through permeable surfaces into contact with the strip, and moving said permeable surfaces in such directions that they tend to oppose the forward movement of the strip on engagement therewith.

Tin Bath

U. S. Pat. 2,377,606. E. V. Blackmun and M. P. Mikula, assignors to Aluminum Co. of America, June 5, 1945. The process of tin plating aluminum articles comprising the steps of dissolving sodium acetate and an alkali metal stannate in water, and subsequently immersing the aluminum articles in said solution for sufficient time to produce on said articles a coating of tin by chemical deposition from said solution.

Sandblasting Nozzle

U. S. Pat. 2,376,287. T. Sorrentino, assignor to Oceanic Ship Scaling Co., Inc., May 15, 1945. A sandblasting nozzle comprising an adaptor to which a sand hose may be connected, a union screwed to said adaptor, a sand nozzle, said union being adapted to connect said sand nozzle to said adaptor, a water jacket surrounding said nozzle, said water jacket having spray openings surrounding said nozzle, and means to attach said jacket to said union.

Bus Bar

U. S. Pat. 2,376,307. L. L. Bosch, assignor to R. E. Kramig & Co., Inc., May 15, 1945. A combination of an electrical bus bar and a sheath extending continuously around the bus bar over substantially its entire length in snug fitting relationship therewith, the said sheath being a hard, dense material comprised primarily of compact asbestos fibers, whereby said sheath is a good heat conductor capable of dissipating from the bus bar heat generated by the passage of electricity through the bus bar, said sheath being of such thickness that two bus bars

(Concluded on page 304)

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METAL CLEANER DEPARTMENT

SHOP PROBLEMS

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POLISHING — BUFFING
CLEANING — PICKLING
HOT DIP FINISHES

METAL FINISHING publishes, each month, a portion of the inquiries answered as a service to subscribers. If any reader disagrees with the answers or knows of better or more information on the problem discussed, the information will be gratefully received and the sender's name will be kept confidential, if desired.

Pickling

Question: Enclosed is self-addressed envelope for a reply to my question in regard to pickling of forging scale on steel shackles and turn-buckles 1" to 1½" stock.

J. A. K.

Answer: We would suggest that you remove this by pickling in hot sulfuric acid of approximately 10% by volume, containing an inhibitor. Inhibitors may be obtained from the list of suppliers attached hereto, taken from our 1944 Buyers' Directory.

Copper Plating

Question: We have a problem concerning the thickness of copper plating and hope you can give us the information necessary to correct it.

Our basis material is the regular 13% antimony, 87% lead alloy which we finish by flashing in cyanide copper and then plating in an acid copper solution. We are anxious to learn what thickness of copper is necessary for these items to stand up under ordinary use. Our items are in the novelty class. After plating, they are oxidized in a sulphur solution then relieved with pumice stone and a rag buff—wet. Our trouble has been that after six or seven months the items become black, which we believe is through absorption since the original lacquer coat is still intact.

How thick does our plate have to be before absorption ceases?

A. M. A.

Answer: We are unable to advise the thickness of copper necessary for these items to stand up under ordinary use, since this will depend on the temperature.

We would suggest that you check carefully to determine whether the blackening of the copper is due to absorption or tarnishing of the copper under the lacquer due to poor rinsing after oxidizing with sulphide or to porous lacquer films.

Finishing Aluminum Parts

Question: We are looking for a suitable good looking, yet inexpensive finish for parts made from aluminum die castings; the finish as corrosion resistant as possible, as these parts are frequently used along the sea coast where the salt air causes rapid corro-

sion. At the present time although anodizing produces an excellent finish on rolled and extruded aluminum, it produces a very poor appearance when applied to die castings. We would be interested in not only a good anodize and dye finish of practically any color, but also any oxide or paint finish which would produce reasonable corrosive resistant properties.

L. OF I. R.

Answer: If the finish produced by anodizing does not have a sufficiently good appearance, we would suggest that you communicate with lacquer manufacturers who will be in a position to supply you with materials suitable for this requirement.

We are forwarding a list of lacquer manufacturers as they appear in our 1944 Buyers' Directory.

Cadmium Plating

Question: We are having considerable trouble cadmium plating on steel with a content of nickel and chromium. This is known, we believe, as N. E. 8740 Steel.

Y. M. P. Co., Inc.

Answer: We would suggest that you treat your articles in a nickel strike before cadmium plating. The solution and conditions are as follows:

Nickel chloride	32 oz./gal.
Muriatic acid	1 pt./gal.
Room temperature	
Direct current	6 volts
Carbon or graphite anodes	
15-30 seconds	

Non-Tarnish Dip

Question: I will greatly appreciate any information you can give me concerning a non-tarnish dip for a ten second gold flash on sterling costume jewelry.

J. S.

Answer: Two suitable treatments are immersion in hot soap solution, or in a cold 12 oz./gal. solution of sodium dichromate.

Test for Water Hardness

Question: We have read with considerable interest the article in your 1944 *Plating and Finishing Guidebook* on Barrel Finishing, particularly the section in regard to Burnishing Soaps.

Would you be good enough to send us a copy or a reprint of the article in *Metal*

Finishing dealing with the test for water hardness and tell us too, where we may procure the small test set for determining water hardness?

T. B. Co., Inc.

Answer: A simple way to determine the hardness of the water supply is with the standard soap solution. The procedure is as follows:

1. Place 50 cc. of the water to be tested in a 4 oz. oil sample bottle and mark the upper point.

2. From a dropping bottle, add 9 drops of standard soap solution and shake vigorously.

3. If 1" head of suds forms and remains stable after 1 minute, the water is zero hard.

4. If not, add more standard soap solution, 15 drops at a time, shaking after each addition until the stable layer of suds is high forms. The number of drops of standard soap used divided by 30 is the hardness of the water in grains per U. S. gallon.

The standard soap solution may be purchased from any large laboratory supply house or, if facilities are available, can be prepared as follows:

1. Run 28.5 cc. normal potassium hydroxide solution into a flask and add a few drops of phenolphthalein indicator.

2. In a separate container, dissolve 10 grams of oleic acid in 75 cc. of neutral ethyl alcohol.

3. Add oleic solution to the potassium hydroxide agitating continuously until the pink color disappears.

4. Dilute with 1,000 cc. ethyl alcohol.

Deposition of Meehanite

Question: We would like to know if you would be able to give us information on "Meehanite."

Do you think Meehanite can be obtained in anode form, and would it be suitable for depositing same in solution?

S.-B. E. Co.

Answer: Although Meehanite can be cast in anode form, we do not know of any process whereby an alloy of iron, nickel and chromium can be electrodeposited.

Pink Gold Solution

Question: Can you give us a formula for plating a pink gold, and what chemicals we can use?

S. J. MFG. Co.

Answer:

41% potassium gold cyanide	1/2 oz./gal.
Potassium cyanide	1 "
Copper cyanide	1/4 "
Nickel cyanide	1/8 "
Dipotassium phosphate	1 "
150-160° F.	2-8 volts

If a darker color is desired, small amounts of copper cyanide may be added.

(Continued on page 317)



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Keystone Metal-Graphite Brushes for low voltage generator and slip ring applications assure dependable electrical energy at all times. Copper and graphite are carefully proportioned to meet the needs of the individual piece of equipment. The brushes have excellent lubricating qualities and molded-in shunts establish a perfect connection. Your order for popular types and sizes can be quickly filled.

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NEW EQUIPMENT AND SUPPLIES

NEW PROCESSES, MATERIALS AND EQUIPMENT FOR THE METAL INDUSTRY

Iridite Galvon

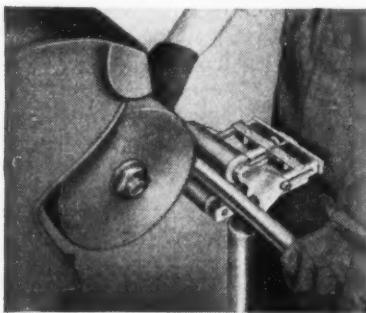
Greater resistance to white corrosion for galvanized products is now made possible through the special development of Iridite Galvon by Rheem Research Products, Inc., Dept. MF, 2523 Pennsylvania Ave., Baltimore 17, Md.

Like its predecessor, Iridite Olive Drab for zinc and cadmium-plated parts, Iridite Galvon is applied by simple dipping at normal room temperatures. No special equipment or personnel are needed; no electric current is used in the process. The basic coating is susceptible to various dye colors.

Accelerated corrosion tests conducted by the company under U. S. Bureau of Standards Salt Spray Specifications indicated no signs of white corrosion products on hot dip galvanized panels after 236 hours.

Iridite Galvon can be applied either to complete assemblies, parts, or to galvanized sheet previous to fabrication.

Tube Polishing Machine

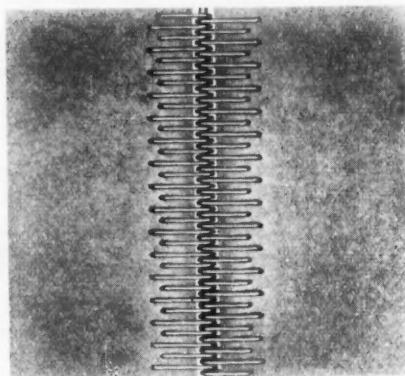


Five times greater production without the spiral effect which is so prevalent when tubing is polished by hand, is claimed for the Presto Semi-Automatic Tube Polishing Machine introduced by The Manderscheid Co., Dept. MF, 605 West Washington St., Chicago 6, Ill.

Presto Tube Polishing Machines are completely portable and adjustable for use with any polishing lathe. The polishing machine is merely pushed up to the wheel, adjusted for height and to fit the tube. Total setting up time is less than five minutes according to the manufacturer. Tapered rubber rollers on the polishing machine hold the tube against the polishing wheel with uniform pressure. As the tube rotates, it automatically feeds slowly across the polishing wheel at a uniform rate, providing an evenly polished tube. The rate of feed is easily and accurately adjustable to suit the job. A foot pedal advances the rollers to provide desired polishing pressure.

Wire Belt Hooks

The Bristol Co., Dept. MF, Mill Supply Division, Waterbury 91, Conn., recently



announced the addition of a line of hinged-type wire belt hooks, known as Bristol's Belt Hooks, to its line of belt lacing products. The new hooks are designed for joining all types of flat belting, including leather, fabric, rubber and balata belts. Various sizes are offered to take care of belts up to $\frac{3}{8}$ inches thick.

A new method of mounting the hooks in the spacer card makes it possible to leave the card in place in the lacing machine during the lacing operation. The hooks are thus held in accurate alignment until the hook points pierce the belt. It is not until after the lacing operation has been completed that the card is removed. This method of carding insures a uniform spacing of the hooks and results in an even distribution of pull over the width of the belt.

The hooks are designed in such a way as to enter the belt in two rows with each opposite point passing into the belt in alternate rows. The purpose of this arrangement is to eliminate interference between opposite hook points as they are pressed into place and also to distribute the grip on the end of the belt over a greater area.

The new belt hooks are described in Bristol's Bulletin No. 737.



Directories

To promote efficiency in war plants, several have adopted the new Acromark Directory now offered by The Acromark Company, Elizabeth, N. J.

It is possible with this directory to give each foreman, engineer, department manager and officer of the shop and office a definite designation by office or location to which all his subordinates will go with no waste of time. Furthermore, this directory system assures that each workman knows his superior by name which also saves time and error.

The directory is for use in a prominent

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Also available
in lead tubes.

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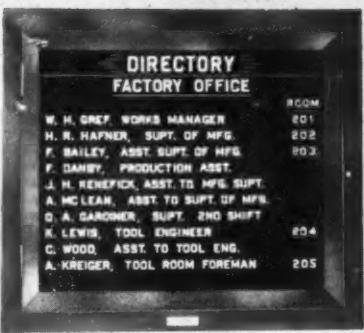
Made in grit sizes
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This is another Formax product that combines traditional Formax quality, dependable uniformity and the know-how of years of experience. There's a Formax compound to fit every requirement, each developed after exhausting scientific research to perform a specific task with a minimum of effort and time. Formax compounds are proven by actual production records to give more pieces per pound of compound. In addition, you benefit from the high production savings that Formax passes on to you.

FORMAX MFG. CO., 3100 Bellevue Ave. DETROIT, MICH.



place in both shop and office, designating those in authority where erected. In the case of large shops and offices of several departments, one may be erected in each department.

The standard size is 24" x 20" and the entire frame of the directory is made of wood. To match wood work or surroundings, it is furnished in any one of several standard color finishes and for fine offices, it is furnished in mahogany, walnut, maple or ebony.

The background for the names that are interchangeable and removable, is made of black felt grooved wood and the letters made of a non-curling, non-fading white or red celluloid. These letters stand out against the black background and are readable for a distance of several yards.

A substantial hinged glass door with lock and key, not only keeps out the dust and dirt, but also keeps control of the board only in the hands of the one responsible for it.

It is reasonably priced and full information, together with illustrations and samples of letters will be submitted upon application to The Acromark Co., Dept. MF, 366 Morrell St., Elizabeth, N. J.

New Starter

A new a-c magnetic reversing starter, featuring a semi-interference-type mechanical interlock, has been announced by the Industrial Control Division of the General Electric Co., Dept. MF, Schenectady, N. Y. Available in sizes 0 and 1, the new starter is designed for full voltage starting of squirrel-cage induction motors, although it can easily be used for reversing service when combined with a reduced voltage starter.

Easy to adjust, the new semi-interference-type mechanical interlock prevents the closing of one contactor while an arc is maintained on the other, thus averting a short circuit through the arc and the resultant burned contacts and blown fuses. In addition, the interlock arm of the closing contactor assists the interlock arm of the opening contactor in reaching its fully opened position. These interlock arms are case-hardened and their underside faces are buffed and polished to provide long life.

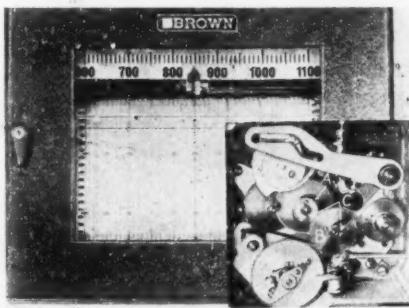
Other features incorporated in this starter are under voltage protection when used with a push-button station or other momentary pilot-circuit device; undervoltage release when used with selector or limit switches; and tamperproof, self-contained overload relays which allow the motor to operate up to its maximum safe temperature before tripping it off the line. The starter is housed

in a sturdy metal enclosure 9 $\frac{1}{2}$ x 13 $\frac{1}{2}$ x 4 $\frac{9}{16}$ in size, equipped with a hook-on cover and finished with smoothly rounded corners. Dust-tight and watertight enclosures are furnished where special conditions warrant.

Electronic Recorders

Increased industrial use of electronic recorders has been made possible, it is announced by Brown Instrument Co., by stepping up chart speeds of Electronik Pyro-Potentiometers.

The standard speed electronic recorders, single or multiple point models, incorporate gear changes for speeds of 5, 10, 15 and 20 inches an hour, it was said at the Philadelphia division of Minneapolis-Honeywell Regulator Company.



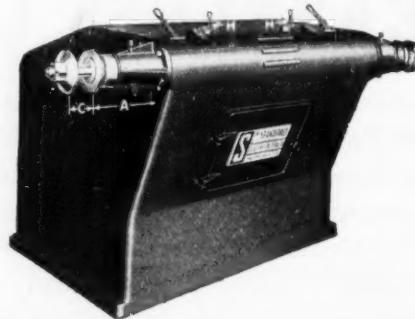
Fast speed electronic models, single or multiple point, will have internally mounted gears for speeds of 10, 20, 30 and 40 inches an hour.

As shown in the accompanying illustration, the gears are changed by removing screw "C" from gears "A" and "B" and by lifting the gears from the assembly. The new speed gears are then installed and screw "C" is replaced.

Further information may be obtained by writing to Brown Instrument Co., Dept. MF, 4479 Wayne Ave., Philadelphia, Pa.

Buffing and Polishing Machine

The Standard Electrical Tool Co., Dept.



MF, 2503 River Road, Cincinnati, Ohio, announces a new addition to their line of Infinitely Variable Speed Buffing and Polishing Machines.

The Type R2V is available in 5 HP and 7 $\frac{1}{2}$ HP sizes. This machine is arranged with two separate spindles, two motors, two magnetic starters, two start-stop push button stations, two hand brakes, each with coincidental switch, and two hand wheel-indicator speed controls. Infinite speed range between 1500 and 3000 R.P.M. quickly ac-

complished merely by turning hand wheel. Each spindle is individually operated, permitting each workman to be independent of the other. This construction has many advantages. Convenient spindle speed change permits polishing, coloring, buffing, etc., with the exact spindle speed required for each operation—and furthermore, as wheels wear the speed may be increased for maintaining the desired peripheral speed. This permits increasing production efficiency and reducing wheel cost.

The "A" dimension measuring from the side of the base to the inside of the wheel is 11", but available to order with 7 $\frac{1}{2}$ " or 17" measurement. Standard length of spindle is 78". Height to center of spindle is 38". The spindle overhangs front of base.

Further information may be obtained by writing to the company at the above address.

Absorbent Sweatband

An absorbent sweatband specially designed for foundrymen, welders and all workers on hot jobs is announced by the American Optical Co., Dept. MF, Southbridge, Mass.

The sweatband is made from synthetic sponge, 7 $\frac{1}{4}$ inches long, which covers the greater width of the brow.

By keeping sweat out of the eyes and goggles, the sweatband helps reduce the possibility of accidents resulting from blurred vision. In addition, it is comfortable and can be easily sterilized for continual use.

A necessity during the hot summer months, the sweatband, which is long wearing, will add greatly to the comfort of workers and thus increase their efficiency.

Multi-Purpose Cart

What could be termed the commercial "Handy Andy" is the new Multi-Purpose Cart, details on which have just been released by the manufacturer—Palmer-Shile Co., Dept. MF, 7124 W. Jefferson, Detroit 17, Mich.

According to E. R. Shile, president, the new carrying unit fits in to those many purposes so far neglected, being ideal for hauling and dumping ashes, scrap, small parts, mixed concrete, liquids, fertilizer and much other miscellaneous material. To meet varied uses, it is designed and balanced for easy wheeling and convenient dumping.

The Multi-Purpose Cart has a heavy steel body, with a reinforcing flange around the top edge. Sturdy tubular handles extend 34" from the body. Legs are of heavy angle iron, and the construction is all-welded throughout. It is equipped with two 24" x 2" steel spoke wheels. Overall measurements



PUT *Beckman* pH CONTROL TO WORK IN YOUR PLANT

- 1. INCREASING PLATING SPEEDS
- 2. REDUCING COSTLY "REJECTS"
- 3. PRODUCING SMOOTHER COATINGS
- 4. IMPROVING PLATING EFFICIENCIES

By Beckman-controlling the pH of your plating processes you can make FOUR important savings in your plant operations . . . vital savings that mean higher quality platings at substantially lower operating costs . . .

1. By closely controlling the pH of your plating baths you can generally operate at higher current densities without risk of faulty coatings. This means faster plating, reduced costs. *And remember—Beckman is the only pH equipment that will accurately control alkaline plating operations such as cadmium, zinc, brass, etc.!*

2. The controlled-coatings produced by Beckman-regulated plating baths minimize blistering, peeling and off-color deposits, thus greatly reducing "rejects" and costly waste of time and materials.

3. Not only are blistering and peeling practically eliminated, but Beckman-controlled coatings are far more uniform and smoother, insuring highest quality platings on run after run.

4. And because Beckman-controlled plating processes are simple to handle and uniformly effective at all times, even inexperienced plant workers can turn out consistently top-quality plating jobs with minimum loss. Over-all plant efficiencies are greatly increased!

LET US HELP YOU take full advantage of the multiple savings possible through Beckman pH Control. Our engineering staff will gladly make recommendations to fit your particular requirements.

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SOUTH PASADENA • CALIFORNIA**

WORLD'S LARGEST MANUFACTURER OF GLASS ELECTRODE pH EQUIPMENT



The Beckman Automatic pH Indicator is the most advanced pH instrument available today. Incorporates many unique features found in no other make or type of equipment. Operates standard control and recording equipment. Ask for Bulletin 16!



The Beckman Industrial pH Meter is ideal for portable plant and field use. Simple, quick, accurate. May be used with Beckman Flow Type and Immersion Type Electrode Assemblies for maintaining pH check on solutions in process. Ask for Bulletin 21!

SEND FOR YOUR COPY OF THESE HELPFUL BECKMAN BOOKLETS!

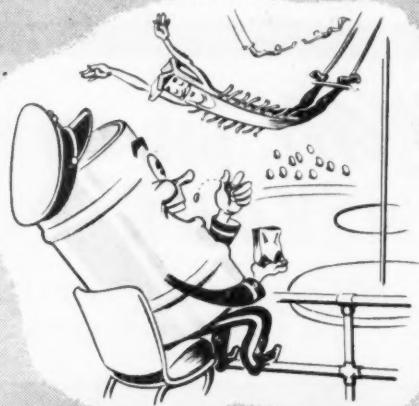
"What Every Executive Should Know About pH"—a simple, non-technical discussion of what pH is, how it's used, and its importance to modern industrial operations.



Bulletin 86—The most complete catalog available on modern pH equipment. Lists and describes over 60 different electrodes together with accessory equipment for all types of applications.

Beckman THE LEADING NAME IN pH

DRIES BY
AIR—
WITH THE
GREATEST
OF EASE



UNICHROME *

AIR-DRY RACK COATING 203

"Swings" Your Toughest Plating Cycle

All you do is dip your racks in the handy open-end drum; hang 'em up to dry at room temperatures and there you are! All set with a tough, resistant insulation that will stand up to your severest solutions. Many shops are getting 500, and even 1000 cycles before recoating.

You see, new and improved synthetic resins are responsible for these outstanding properties of Unichrome Air-Dry Rack Coating 203. Constant research in selecting and formulating these resins makes sure that you get maximum rack protection and minimum recoating cost. Why not decide to see for yourself—with a trial order today? Write now to our nearest office for data and prices.

*Reg. U.S. Pat. Off.

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PROPERTIES

Chemical Resistance—Excellent for all plating cycles.

Toughness—Withstands repeated flexing and shop handling—cuts cleanly and easily at contacts.

Drying—Dipped in container in which it is shipped and dried at room temperature.

Adherence—Excellent.

TRY THESE OTHER UNICHROME MATERIALS

Unichrome Coating 202—a new rack insulation, similar to Air Dry 203 but which is force dried to obtain the extra adherence required in anodizing and hot, strongly alkaline solution.

Unichrome Quick Dry Step-Off 322—for cyanide copper and other plating work requiring an extremely adherent step-off.

Unichrome Quick Dry Step-Off 323—for chromium and other plating work re-

quiring a step-off that can be peeled off after use.

Unichrome Resist—a solid insulating material for constructing composite racks, step-off shields, insulating gaskets, etc.

are 79" long, 30" high, 30" wide. Further information can be obtained by writing to the manufacturer direct.

Alloy Sprayer

A new, self-contained Alloy-Sprayer designed and built especially for precision spraying of low temperature metals and alloys is added to its line of metal atomizers by *Alloy-Sprayer Co.*, Dept. MF, 602 First National Bldg., Ann Arbor, Mich.

This new sprayer, which is being used extensively for production spraying of selenium rectifier cells, rectifier discs, for protective coating of wood patterns, and similar spraying, is expected to be particularly useful in laboratory research work due to the close control of the characteristics of the spray.

Although the new Alloy-Sprayer, designated "Model FP," is primarily for spraying vertically downward, being suspended on a chain or similar support, it can be swung

out to spray almost horizontally. Thus, it can be used for virtually any type of spraying either on a production basis or as a strictly laboratory instrument.

The sprayer is equipped to permit instant selection of quality of spray. The application of alloy or metal can be made in three stages: Fine spray, coarse spray, and pour. Moreover, the degree of fineness and the degree of coarseness of spray in each stage can be varied by means of an adjustable needle valve. Both stages of spray are accomplished with air pressure on, while the pouring is done with air pressure cut off entirely.

A feature of the Model FP Sprayer is that metal or alloy can be added without interrupting the spraying operation. Moreover, metal can be added intermittently as needed and does not need to be in special form.

Range of operation of the Model FP

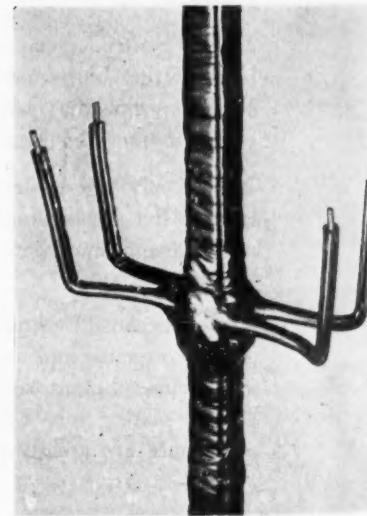
Sprayer is 100° to 600° F. Metal or alloy in almost any form is melted in the pot preparatory to spraying by means of thermostatically controlled electrical elements. Operating air pressures are from 20 to 60 pounds per square inch depending on the needs of the work.

Installation of the new equipment is merely a matter of suspending the sprayer by a chain or wire, connecting into the factory air line (or bottled air or nitrogen) and plugging in the electrical cord which is furnished with the sprayer.

Spraying is accomplished by grasping the handle and pressing the lever. A smaller auxiliary control is easily moved by the thumb to change from fine, to coarse, to the pour stages of spray.

Rack Insulation

A new product for the insulation of plating racks has been announced by Michigan Chrome and Chemical Co., 6348 East Jefferson Ave., Detroit 7, Mich. Known as Microtube, it is a companion product to the firm's Microtape with which it is usually used. Microtube is an extruded tubing made from a tough, elastic plastic base material that has exceptional resistance to plating baths and cleaning solutions. It will withstand hot plating solutions, including 180-190° copper, and practically all types of boiling cleaning solutions indefinitely without



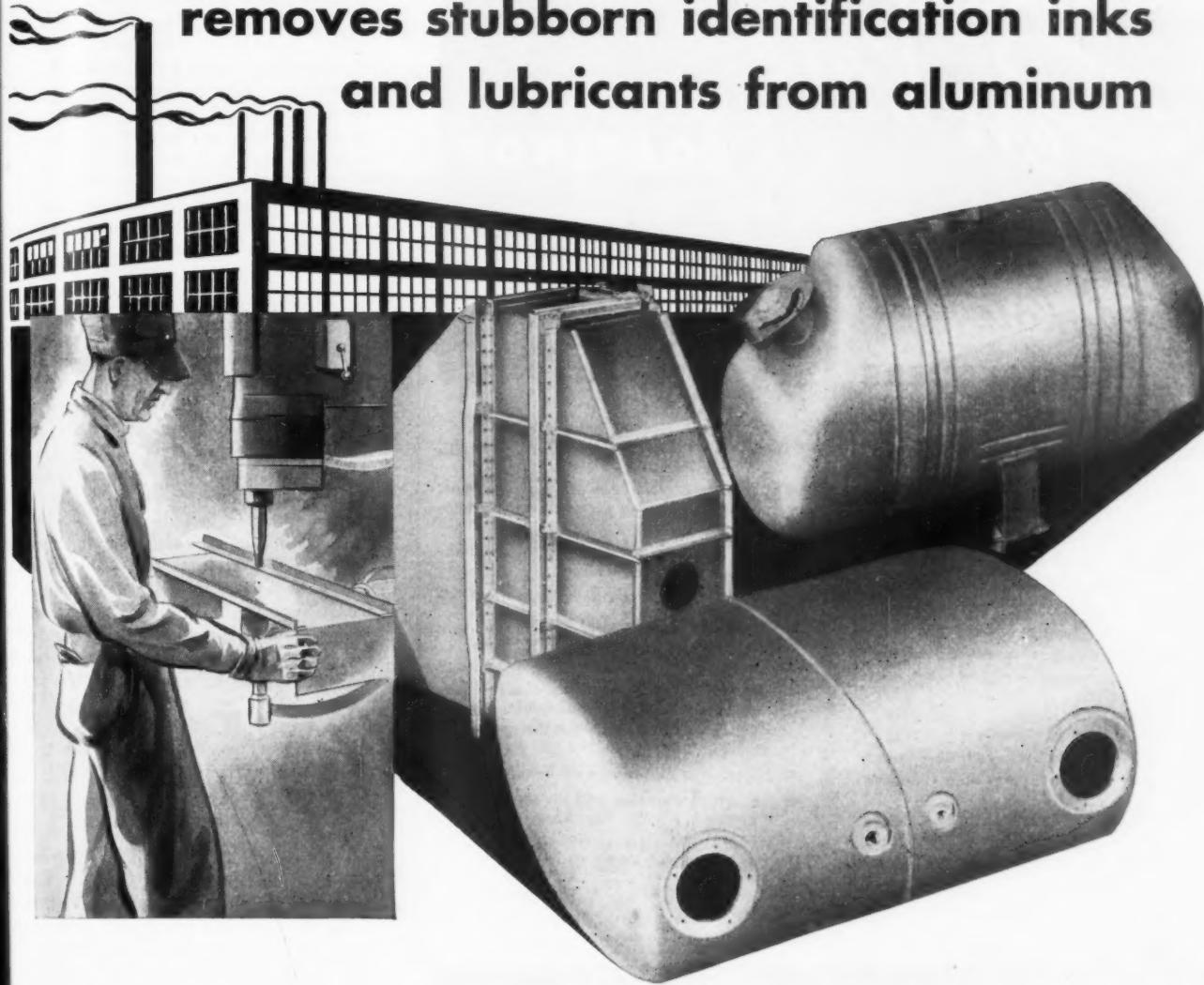
damage or deterioration. It is not recommended for use in trichlorethylene. Microtube remains tough and flexible under the most adverse conditions and will not harden or crack. Its surface is smooth and glossy which permits solutions to drain from the racks more quickly and thoroughly.

Microtube is usually used in combination with Microtape. The contact wires of the rack are covered with Microtube and the spline is wrapped with Microtape. The two materials can then be fused by heating into a continuous, homogeneous coating. In this way a solid protective coating of any desired thickness can be obtained quickly and easily without repetitive dipping and drying. On certain types of racks it is possible to insulate the whole rack with Microtube.

Microtube is available with inside diameters ranging from 1/16" to 1".

How WAR PLANT

removes stubborn identification inks
and lubricants from aluminum



DIVERSEY D-C No. 36 cuts anodizing and spot welding rejects

EXPERT HELP ON METAL CLEANING

If you need help on any metal cleaning . . . or working . . . problem, just call for the DIVERSEY D-Man. Backed by a Research Laboratory that has spent 20 years developing special purpose products, he is always on deck to lend a helping hand . . . often finds ways to step up production with less manpower.



Officials in a midwest war plant wanted to reduce the number of rejects on anodized and spot welded aluminum parts. Investigation by a Diversey D-Man showed that cleaning solutions then in use did not completely remove: 1. lubricants used in forming operations; 2. stubborn identification inks.

DIVERSEY D-C No. 36 in still tank solution was recommended. After the change was made, rejects were practically eliminated, cleaning time was reduced and production increased. Also, tank solution had a longer life, white film disappeared, and the new solution was 100% free rinsing.

Repeated laboratory tests and wide usage in the field prove that DIVERSEY D-C No. 36 removes all

kinds of contamination faster. Inks only partially removed in 10 to 15 minutes with ordinary cleaners, for example, are completely removed in 4 to 5 minutes with D-C No. 36. And there's no risk of staining, pitting, or corrosion.

Excellent cleaning with D-C No. 36 is largely due to carefully determined wetting and emulsifying properties. Economical operation is assured by superior water softening action. Get acquainted with this ideal cleaner . . . to prepare aluminum for anodizing, welding, painting or matte finishing. For a liberal experimental sample and complete information, write to: Metal Industries Department.

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Pen-Kote

**PROTECTIVE
COATINGS**

For Every Plating Plant Requirement

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MASKING LACQUERS
For Hard Chrome—Copper and
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All Pen-Kote Masking Lacquers can be applied by brush, dip or spray and are unusually quick-drying. They adhere firmly, giving sharp definition of stop-off line, yet are trimmed easily by cutting and peeling. Being chemically inert, they cannot contaminate solutions or tarnish the work. They provide a durable, perfect protective coating of high dielectric strength, and are quickly removed after plating.

Pen-Kote Masking Lacquers will give you faster, trouble-free production on all selective plating jobs, with an appreciable reduction in costs.

New bulletin gives full details. Write for your free copy today



PENINSULAR CHEMICAL PRODUCTS CO.
6795 EAST NINE MILE ROAD
VAN DYKE • MICHIGAN

P A T E N T S

(Concluded from page 294)

having such sheaths may be placed in side by side relationship without short circuiting of electrical energy carried by bus bars housed within such sheaths.

Wet Sandblasting

U. S. Pat. 2,376,616. S. J. Oechsle and J. N. Childs, assignors to Metalweld, Inc., May 22, 1945. In an apparatus for effecting wet sandblasting, a combining nozzle for intimately mixing dry sand and water comprising a main discharge tube for the wetted sand, a sand-jet-producing nozzle fitted in one end of said tube and having a bore therethrough coaxial with the tube, an annular water jacket surrounding said tube adapted for connection to a continuous sup-

ply of water, said tube constituting the inner wall of said annular water jacket and having a plurality of openings therethrough affording communication between the water jacket and the interior of said tube, and means for continuously delivering a supply of sand under pressure to said nozzle for mixture with the water drawn from said water jacket.

Centrifugal Blasting

U. S. Pat. 2,376,639. C. E. Unger, assignor to The American Foundry Equipment Co., May 22, 1945. A blade adapted for use in centrifugal abrasive throwing wheels of the character including a rotor adapted to be driven at high speeds and carrying a plurality of substantially radially extending throwing surfaces with means for feeding abrasive into the inner ends of said surface, said blades having a propelling surface along

which the abrasive may be gradually accelerated, the blades being formed from a metallic compound which is highly resistant to abrasive wear impact shocks and metal fatigue incident to prolonged operation in the throwing of steel grits, sand and similar abrasive particles at blasting velocities, said metallic compound including less than 1.5% by weight of carbon, between 0.50 and 0.90% by weight of silicon, between 0.50 and 0.90% by weight of manganese, between 0.90 and 1.40% by weight of chromium, between 1.40 and 1.90% by weight of molybdenum, and the remainder substantially pure iron.

Grinding & Buffing Machine

U. S. Pat. 2,376,847. F. C. Glike, assignor to International Silver Co., May 22, 1945. In an apparatus of the character set forth, the combination of a rotary carrier having means for holding elongated metallic articles on the periphery thereof, an abrasive and flexible belt supported and tensioned by means wholly independently of said rotary carrier with the belt disposed parallel with the axis of the rotary carrier and traveling in a direction at right angles thereto but to one side thereof and a substantially rigid back support disposed closely adjacent the periphery of the rotary carrier and having a concave surface corresponding generally to the cylindrical convex path of the articles against which back support the articles are firmly pressed by the rotary carrier with the abrasive belt passing therebetween and following said cylindrical convex path.

Bus Bar

U. S. Pat. 2,376,324. R. L. Bogardus, assignor to Packard Motor Car Co., May 22, 1945. A bus system comprising a section of co-axially arranged inner and outer tubular conductors insulated from each other and a line tap for the inner conductor including a T-headed bolt, a metal sleeve slidably fitting the shank thereof, the inner tube having a longitudinally disposed opening to just pass said bolt head, the outer tube having a circular opening just larger than the major axis of said head, the head being positioned transversely of and within the inner tube with the sleeve surrounding the bolt shank and bearing on the outer surface of the inner tube, an insulating sleeve surrounding the metal sleeve and having its inner end bearing on the inner tube, and a washer and lock nut on the bolt to clamp the inner tube between said head and metal sleeve.

Corrosion Prevention of Metals

U. S. Pat. 2,375,468. W. J. Clifford and H. H. Adams (England), assignors to Parker Rust-Proof Co., May 8, 1945. A composition consisting essentially of acid phosphate coating chemicals and an organic compound which contains the nitro group in sufficient quantity to act as an accelerator.

Coloring Stainless Steel

U. S. Pat. 2,375,613. C. Batcheller, May 8, 1945. Those steps in the method of producing a design in color on a polished surface of a corrosion-resisting, alloy steel con-

aining a substantial quantity, by weight, of chromium and having therein and substantially integral therewith a film containing oxides of iron and chromium imparting a distinctive dark coloration to said surface which comprise, coating those portions of said surface which it is desired to preserve in color with a resist, and thereafter removing the color film from the uncoated portions of said surface by subjecting said uncoated portions to electrolytic action as anode in an aqueous electrolyte having good electrical conductivity.

Polishing Plastics

U. S. Pat. 2,375,823. A. Saunders and S. Engle, assignors to Interchemical Corp., May 15, 1945. The method of polishing a non-thermoplastic resinous finish, which comprises subjecting it to the action of a polishing agent in an aqueous vehicle, the polishing agent consisting essentially of a hydrated calcium silicate having an average particle size below about 1 micron, and containing about 18% by weight CaO, 64% by weight SiO₂, and 14% by weight combined water.

Polishing Plastics

U. S. Pat. 2,375,824. A. Saunders and S. Engle, assignors to Interchemical Corp., May 15, 1945. A polishing composition characterized by its ability to produce a haze-free, glossy surface on non-thermoplastic resinous finishes, which comprises a vehicle containing essentially a liquid consisting of formamide, and a polishing abrasive dispersed in the liquid consisting essentially of a hydrated calcium silicate powder containing about 18% by weight CaO, 64% by weight SiO₂, and 14% by weight chemically combined water.

Cadmium Bath

U. S. Pat. 2,377,228. C. G. Harford, assignor to Arthur D. Little, Inc., May 29, 1945. An aqueous electrolyte for the electroplating deposition of cadmium, characterized by consisting essentially of a soluble salt of cadmium and an alkyl hydrocarbon polyaniline and manifesting a pH value between approximately 9 and 10.3.

Chromium Bath

U. S. Pat. 2,377,229. C. G. Harford, assignor to Arthur D. Little, Inc., May 29, 1945. An aqueous electrolyte for the electroplating deposition of chromium characterized by consisting essentially of a soluble salt of chromium and an alkyl hydrocarbon polyaniline and manifesting a pH value below 7.0.

Vitreous Enameling

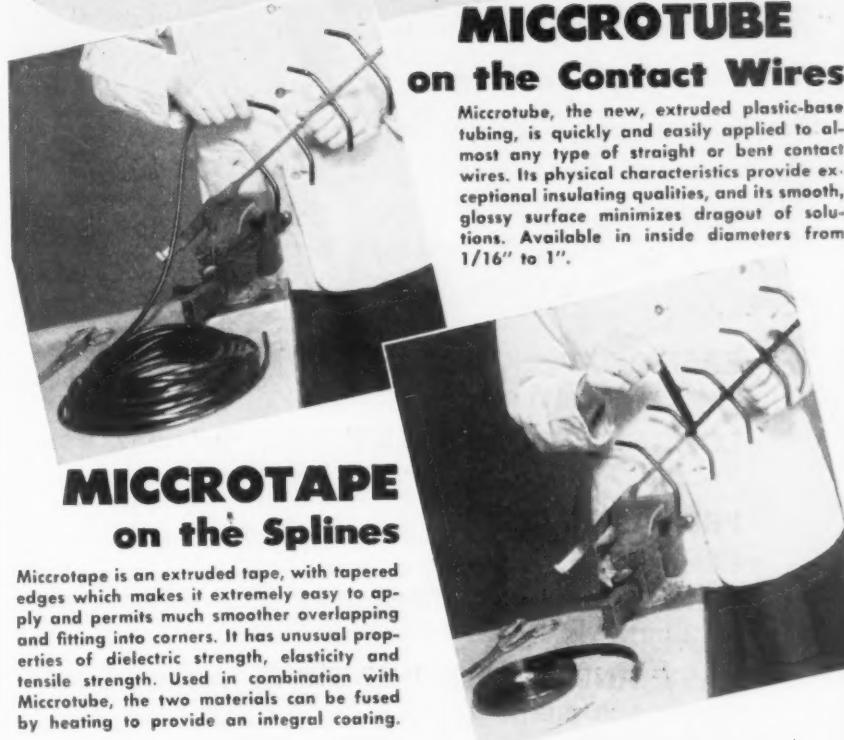
U. S. Pat. 2,377,321. M. Brown and R. E. Barr, assignors to Western Electric Co., Inc., June 5, 1945. A method of forming an enamel coated article which comprises copper plating a ferrous metal base, electrodepositing an alloy of from 0.50% to 10.0% iron and the balance nickel on the copper plate, and applying a vitreous enamel coating over the alloy plate.

The Fast, Effective Method of INSULATING PLATING RACKS

MICCROTUBE

on the Contact Wires

Microtube, the new, extruded plastic-base tubing, is quickly and easily applied to almost any type of straight or bent contact wires. Its physical characteristics provide exceptional insulating qualities, and its smooth, glossy surface minimizes dragout of solutions. Available in inside diameters from 1/16" to 1".



MICCROTAPE

on the Splines

Microtape is an extruded tape, with tapered edges which makes it extremely easy to apply and permits much smoother overlapping and fitting into corners. It has unusual properties of dielectric strength, elasticity and tensile strength. Used in combination with Microtube, the two materials can be fused by heating to provide an integral coating.

A new six page bulletin provides complete information on Microtape and Microtube used both for insulation of plating racks and for masking parts prior to selective plating. Full details on physical characteristics, methods of application, and prices are included. Your copy will be mailed you immediately upon request.

MICHIGAN CHROME & CHEMICAL CO.
6348 EAST JEFFERSON • DETROIT-7, MICHIGAN

PLATING OF DIE CASTINGS ON FULL AUTOMATIC CONVEYOR

(Concluded from page 287)

was pumped into a storage tank, through activated carbon, about once each month. The pH of the plating solution was checked three times in the twenty hour operating period, while complete analyses were made twice weekly. Analyses of the chromium plating solution, cyanide tanks, cleaners and acid dips were made daily.

The conveyor described in this article was employed very successfully during 1939, 1940 and 1941 for plating zinc-base die castings used for automobile trim.



"THIS IS MR. BUDGE, OUR EMPLOYMENT AGENT. HE'D LIKE TO MEET ANY OF YOU LADIES WHO THINK YOU CAN DRIVE THIS BUS BETTER THAN I CAN."

LOWEST COST-PER-HOUR



In selecting a rack insulation, remember that the total cost is not just the first cost of the insulation itself.

COST - PER - HOUR - OF - USE determines the value of a rack insulation in your production.

BUNATOL No. 160 or No. 720 will keep down rack insulation costs—give you better insulation value—in handling decorative plating; here's why—

EASE OF APPLICATION: neither skilled labor nor special equipment required.

LONG INSULATION LIFE with freedom from trouble.

FREE RINSING: no carry-over to contaminate solution.

CHEMICALLY NEUTRAL: will not affect any solution.

EASY AND SIMPLE PATCHING: present labor conditions mean frequent rack repair.

NOT TOXIC: stops employee sickness and claims.

STOPS SHADING in bright nickel.

Get **BUNATOL**—the rack insulation made for and preferred by Production Platers.

NELSON J. QUINN CO., TOLEDO 7, OHIO

BUNATOL

Business Items

J. S. Hicok, Sales Manager, Promat Division, Poor & Co., Waukegan, Ill., announces the appointment of the W. D. MacDermid Chemical Co. of Bristol, Conn., as exclusive New England distributor, for all equipment and processes of their manufacture. The Promat organization offer the metal finishing industry a number of high speed electroplating solutions based on the superimposition of AC on DC.

In addition to the main office at Bristol,

Conn., MacDermid also maintain a sales and service office at Worcester, Mass.

Appointment of Robert Wier, Jr., as general sales manager of the brush division of the Osborn Mfg. Co., of Cleveland, is announced by company officials.

Mr. Wier, a native of Wilmington, Del., brings to Osborn a background of engineering and sales experience gained over a period of nearly 30 years in the chemical, oil and ammunition industries following his graduation from Sheffield Scientific School of Yale University in 1918.

He was formerly sales manager of the



Robert Wier, Jr.

Western Cartridge Co. with headquarters the Winchester Repeating Arms Co. division in New Haven, Conn., and prior to that vice-president and general manager of the Hearn Oil Co., subsidiary of the Sun Oil Co.

Mr. Wier began his business career as junior engineer with E. I. duPont de Nemours & Co. in its Nashville, Tenn., Racine, Wis., and Deepwater, N. J., plants.

His initial undertaking for Osborn was a survey of reconversion problems and post-war markets, to be conducted in the thirty districts of the United States served by this well-known manufacturer of power brushes and equipment for industry.

New and larger Pacific Coast Region office of **Detrex Corp.**, Detroit, Mich., have been established at 318 West Ninth St., Los Angeles 15, Cal.

This office which is under the supervision of Mr. S. B. Crooks, Pacific Region Manager, functions as sales and service headquarters for the Pacific Coast and Rocky Mountain states. In addition to controlling division offices in the territory, the Los Angeles branch supervises all local stocks of degreasing solvents and standard metal cleaning machines. Direct customer service for Southern California is also handled from this office.

In keeping with extensive plans for plant expansion, the **Ilg Electric Ventilator Co.**, Chicago, Ill., has opened new branch offices in Grand Rapids and Knoxville and appointed new sales engineers in Dallas and Philadelphia. This brings the total number of Ilg branch offices to 40.

The newly appointed Dallas sales engineer is **Marvin Gardner**, who since 1939 has been associated with the heating and ventilating industry. Before joining Ilg he was head of the ventilating department of the **Ingalls Shipbuilding Corp.**, Pascagoula, Miss. Previously, Gardner was engaged in the heating and ventilating contracting business in commercial and residential installations. In 1942 he joined the Maritime Commission.

ventilating engineer. Gardner is a graduate of Southern Methodist University.

George A. Innes, a lifelong resident of Philadelphia, has been appointed an Ilg sales engineer under **C. Warner Smith**, manager of the Philadelphia office. His experience includes eight years with the Celotex Corp., during which he actively participated in the design and development of numerous applications of that company's special materials which were closely connected with the heating and ventilating industries. Prior to his association with Ilg, he was with *The Barrett Division of Allied Chemical and Dye Corp.*, engineer on roofing and waterproofing. He received his training at Temple University and Drexel.

The new Ilg branch office in Knoxville, Tenn., is under the direction of **Roy H. Mackay**, who for the past four years acted as associate engineer for the U. S. Bureau of Reclamation, Washington, D. C. Previously, he was construction engineer for the *Brace Engineering Co.* and the *Stone & Webster Engineering Corp.* Mackay is a graduate of Columbia University.

J. W. Pulte has opened the new Ilg branch office in Grand Rapids, Mich. A discharged veteran of World War II, Pulte has had nearly ten years' experience in the heating and ventilating field. Before joining Ilg, he was field engineer in Western Michigan for *Detres Corp.*, Detroit, Mich. Pulte is a member of the *American Society of Heating and Ventilating Engineers* and the *American Electroplaters' Society*.

Appointment of **Albert R. Tucker** to the newly created position of West Coast manager of the *Electrochemicals Department*, *E. I. du Pont de Nemours & Co.*, was announced today by **F. S. MacGregor**, the department's general manager.

The El Monte plant and sales office at El Monte, Calif., and the district sales office at San Francisco, will be consolidated under



Albert R. Tucker

SANDOZ CHEMICAL WORKS, Inc.

61-63 VAN DAM STREET, NEW YORK 13, N. Y.

Mr. Tucker, who has been Philadelphia district manager for the department since 1936, West Coast headquarters will be maintained at El Monte.

Technical service representatives for the electroplating, drycleaning and degreasing fields will have headquarters at El Monte. Resident salesmen will be established at Seattle, San Francisco, and Los Angeles.

Frederick C. Schumacher, former assistant manager of the New York district office, has succeeded Mr. Tucker as manager of the Philadelphia district office.

Mr. Tucker is a native of Noblesville, Ind. After having been graduated from Butler College with a bachelor of arts degree in chemistry in 1915, he was employed by the Du Pont Co. in the acid laboratory at Hope-

well, Va. In 1918 he was transferred to the company's Arlington, N. J., plastics plant.

He was appointed plastics sales representative in the Middle West in February, 1925. On January 1, 1934, he was transferred to Wilmington and made sales manager of peroxygen products.

Mr. W. P. Drake, manager of sales, *Special Chemicals Division, Pennsylvania Salt Mfg. Co.*, Philadelphia 7, Pa., announces the appointment on April 9th of **Mr. John J. Lance**, as field representative for that Division, in the Cleveland-Mansfield-Youngstown area, with headquarters in Cleveland. Mr. Lance was formerly a methods engineer in the *Bendix Aviation Corp.*

HOLDS
THAT
LINE!



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"QUICK DRY" STOP-OFF 322

Makes Your Work Easier, Faster, Better

Tight-holding, clean cutting edges that won't budge a whisker—not even for the toughest plating solutions—that's what Unichrome Stop-Off 322 gives you. This helps you do more accurate work—faster, easier. And besides, Unichrome is most convenient to use. Simply brush, spray or dip. At room temperatures, too. Another thing—it dries fast. Finally, there's no peeling or seepage with Unichrome Stop-Off 322 on the job.

Let us put you down for a trial shipment. See these advantages for yourself. There's a heavy war demand for the new and improved resins in Unichrome Stop-Off 322. But, we'll rush it to you as fast as possible. Write our nearest office for prices and complete data.

*Reg. U.S. Pat. Off.

UNITED CHROMIUM, INCORPORATED

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PROPERTIES

Chemical Resistance — Excellent in all plating cycles.

Application — Can be brushed, sprayed or dipped.

Drying — Dries quickly at room temperature—adheres without force drying.

Stripping — After plating, material may be removed by dissolving in Remover 322 R.A.

TRY THESE OTHER UNICHROME MATERIALS

Unichrome Quick Dry Stop-Off 322 — for chromium and other plating work requiring a stop-off that can be peeled off after use.

dried at room temperature, for use in all plating solutions.

in anodizing and hot, strongly alkaline solutions.

Unichrome Air-Dry Rock Coating 203 — a rock insulation similar to Air Dry but which is forced dried to obtain the extra adherence required

for constructing composite rocks, stop-off shields, insulating gaskets, etc.

Mr. Frank E. Murphy, formerly assistant manager of Research and Development Department, has been appointed director of Development Division, Research and Development Department, Pennsylvania Salt Manufacturing Co., Philadelphia, Pa., according to recent announcement by Dr. S. C. Ogburn, Jr., manager. In his new position Mr. Murphy will have charge of chemical engineering activities including pilot plant operations, engineering research and related fields of work. He will be located at Whitemarsh Research Laboratories though a substantial amount of the work involved will be carried out at various plants of the company.

The Udylite Corporation, of Detroit, manufacturers of plating equipment and supplies, is increasing the facilities of both Detroit plants to meet the contemplated heavy post-war demand for its products. An additional 16,000 square feet of floor space has been

acquired for the East Grand Boulevard Plant and 15,000 square feet of floor space is being added to the East McNichols Road Plant.

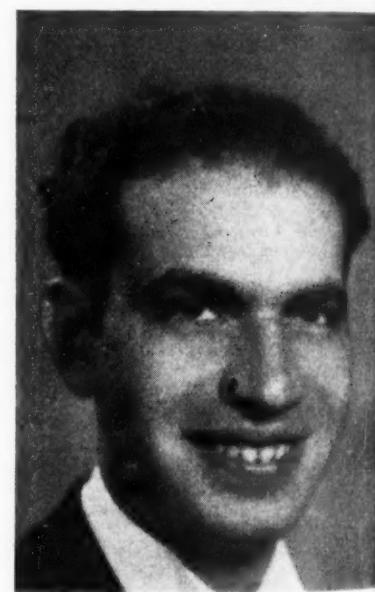
The Wallace G. Imhoff Co. has announced that the company has moved from Vineland, N. J., to 905 South Bedford St., Los Angeles, Calif.

Enoch Perkins, vice-president of Mutual Chemical Co. of America, has been appointed technical consultant on chrome ore for the Foreign Economic Administration and expects to leave shortly for Europe. Mr. Perkins has had extensive experience in the chrome ore industry, having served as the manager of Mutual's New Caledonia Chrome Ore Mines since 1924, and has also visited most of the important chrome ore mines throughout the world. During the war he has served on various committees and acted in a consulting capacity on war problems



Enoch Perkins

related to chrome ore. F.E.A. estimates his present mission will be completed about a month.



Milton Levine

Mr. Milton Levine, treasurer of the *Plating Equipment Corp.*, is now in the armed forces, stationed at Camp Blanding, Florida. Mr. Levine joined his father in the business in 1934. His brother Harvey, secretary of the corporation, is serving with the Signal Corps in India, leaving Mr. Levine Senior, to carry on the business.

The *Phillips Chemical Co.* is pleased to announce the appointment of Dr. Melvin Agruss as general manager.

Dr. Agruss has a wealth of background both in research and industrial chemistry and has numerous publications and patents to his credit. He received his chemical

engineering degree at Washington University and later, while doing graduate work at Chicago University, conducted and operated a pilot plant for the extraction and isolation of Element 91, Protoactinium. This successful research feat was widely publicized in technical publications at the time (1932-1935) and earned him his Ph. D. degree in chemistry at Chicago University.

In the industrial field Dr. Agruss was assistant to the plant superintendent of the Titania Pigment Corp. and later in charge of the metallurgical research at the A. C. Smith Corp. in Milwaukee. For the past ten years he has been associate director of research for the Pure Oil Co.

The War Production Board has awarded Mutual Chemical Co. of America a project for building a new Bichromate of Soda plant at Lake Charles, La. The plant is being built and will be operated by Mutual for account of Defense Plant Corporation and should be in production the early part of 1946.

The firm of Sanderson & Porter, who have been engaged by Mutual as engineering contractors, are already on the site and design work has advanced to a point where they are now ready to start the construction and the adaptation of existing facilities now owned by DPC.

Manufacturers' Literature

Mechanical Rubber Products

Printing of the Fifth Edition of "Manhattan Rubber Products for Industry", a condensed catalog of mechanical rubber goods, has been completed by The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. Copies are available on request.

Described in this catalog are many mechanical rubber products and special items manufactured by Manhattan Rubber. Particular emphasis is given transmission and conveyor belting, V-belts, hose, packing, belted rubber products, rubber roll coverings, tank linings, and abrasive wheels. Copies may be obtained by writing to the company at the above address.

Cleaners

Klem Chemical Works, Dept. MF, 1500 - 8 E. Woodbridge, Detroit 7, Mich., has released a new piece of literature covering Klem Cleaners and Klem Products. This is an eight page folder covering cleaning, derusting, phosphatizing, soldering and maintenance processes.

A step by step procedure is outlined to acquaint the purchasing personnel with the diversified uses of the products which they are purchasing. Also this folder is written for the shop superintendent, the factory manager, the chemist and the metallurgist or the process engineer.

Fully described processes explain the use of phosphoric acid cleaners, alkali power wash and still tank cleaners, maintenance



The Detrex Degreaser shown at the left has been in continuous operation for 9 years

Detrex Degreasers

HAVE HAD YEARS
OF STEADY SERVICE

The firm of Philip Sievering, Inc., in New York City, has been in business since 1889 and today is one of the largest contract electroplating concerns in the United States. For the cleaning of all types of work prior to plating, anodizing or rust-proofing this concern uses the two Detrex Degreasers shown.

In many other plating plants throughout the country, Detrex machines and solvents provide the thoroughly clean metal surfaces which are so essential as the first step in high quality plating work. Complete details on the equipment best suited for cleaning prior to plating, regardless of production volume, are yours upon request.



DETROIT 27

Solvent Degreasers

DETREX
13009 HILLVIEW AVE.
MICHIGAN

• Metal Parts Washers
Industrial Cleaning Compounds

• Processing Equipment

Corporation

cleaners, soldering fluxes, spray booth compounds and enamel or paint removers.

On the inside of the back cover is a layout chart of the concentrations of the cleaners used for respective work, and under specific conditions.

Electronic Controls

Wheelco Instruments Co., Dept. MF, Harrison and Peoria Sts., Chicago, has issued a new 12-page catalog on "Wheelco Electronic Controls". Designated Z-6300, it is designed to supply a convenient, condensed listing of principal items of equipment supplied by the company. The bulletin describes the company's electronic principle by which control is effected without contact between measuring and control units of an instrument, and gives brief descriptions and prices of indicating pyrometers and pyrometer controllers, indicating resistance thermometers and resistance thermometer controllers, input controllers, program controllers, portable potentiometers, combustion safeguards, and thermocouples.

Airless Wheelablator

A new, 24-page informative catalog recently published by *American Foundry Equipment Co.*, Dept. MF, 555 S. Byrkit St., Mishawaka, Ind., concisely answers every question about the Wheelablator—the simple mechanical unit that utilizes controlled centrifugal force, instead of compressed air, for abrasive blasting.

This booklet is the first inclusive, concise presentation of all phases of airless blast cleaning in the metal working field; consequently, it is of value to all plants in which blast cleaning is an important part of their production.

The Wheelablator principle and mechanism which has so revolutionized blast cleaning is presented in this profusely illustrated catalog, with interesting facts, diagrams and tables. Complete sizes of the three types of blast cleaning machines on which the Wheelablator is offered—Tumbblast, Tables and Special cabinets—are illustrated and described.

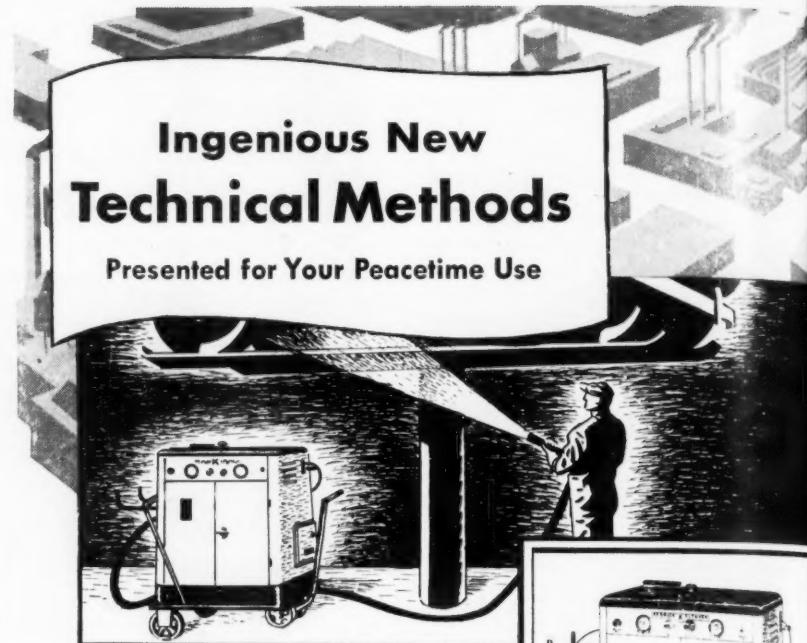
A partial list of the multitude of products being Wheelabrated, and a few of the over 2,000 Wheelablator users are included to illustrate the versatility and acceptance of the Wheelablator in industry.

The range of Wheelabrated metal finishes which is possible with the use of the various sizes of steel shot and grit abrasive is shown in a series of magnified illustrations with suitable descriptions.

A copy of catalog No. 74 may be had by writing directly to *American Foundry Equipment Co.*, Dept. MF, Mishawaka, Ind.

Metallurgists and Consultants

A four-page folder, outlining the services and facilities of *Sam Tour & Co., Inc.*, metallurgists, engineers and consultants, has just been issued. It contains views of the several laboratories housed in the company's own buildings at 44 Trinity Place, New York 6, and lists the nature of assignments under-



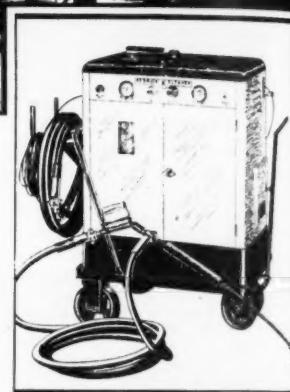
Coming to Users of Gas-Powered Equipment 80% SAVINGS IN CLEANING TIME With Steam Rig Now the Army's Standby

An economical solution to the problem of cleaning and de-greasing trucks, passenger cars, tractors, locomotives, excavators, and the like will be available to garages, service stations, all users of oil-burning equipment, as soon as war demands permit. It is a more efficient steam cleaner now in use by the thousands in the Armed Forces.

Neat "housekeeping" has too often been neglected by industry due to the costliness of hand labor. But the best housekeepers in the World, the U. S. Army, Navy and Marine Corps, dare not neglect frequent and thorough cleaning of all equipment to safeguard against fire and malfunctioning, and to permit fast, certain inspection. This cleaner, developed to meet their high standards, removes grease, dirt and grit 5 times as fast as any other method. It cleans by a balanced combination of heat, detergent, water and friction. It is typically "army" in simplicity of design and operation; in 30 minutes, the entire machine can be dismantled and completely cleaned.

Wartime uses of Wrigley's Spearmint Gum also point the way that industry may benefit when this quality product again becomes available. It will again be a "help on the job" in many ways. Right now no Wrigley's Spearmint is being made, as present conditions do not permit the manufacture of Wrigley's Spearmint in quantity and quality sufficient for all. But remember the Wrigley's Spearmint wrapper—it is a certificate of highest quality and flavor—and will always remain just that.

You can get complete information from
Clayton Manufacturing Company, Alhambra, Calif.



The Kerrick Cleaner



Remember this wrapper

taken in metallurgical and chemical engineering, metal finishing, corrosion, physical metallurgy and consultations. Copies will be sent free on request. Copies may be obtained by writing to *Sam Tour & Co., Inc.*, Dept. MF, 44 Trinity Place, New York 6, N. Y.

Aluminum Preparation

Process K-1-B, improved material for preparing aluminum for spot welding, is described in a 12-page bulletin published by *Kelite Products Inc.*, 909 E. 60th St., Los Angeles 1, Calif. The bulletin also discusses the full cycle of chemical baths and rinses which precede production line spot welding.

Electric Controls

Bulletin F-2287-1 discusses the *Barber-Colman* electric system of temperature control which is available for heating, ventilating, air conditioning, and industrial applications. Described in the bulletin are the various room, duct, immersion, and remote bulb thermostats which are available. It also describes the complete line of motor-operated valves, control motors, and packaged sets of control equipment available for the maintenance of water temperatures in hot water storage tanks.

Copies may be obtained by writing to *Barber-Colman*, Dept. MF, 1215 Rock St., Rockford, Ill.

Associations and Societies

American Electroplaters' Society
Los Angeles Branch

PROGRAM DIRECTORY BOOK

The issue of the Program Directory Book, published by the Los Angeles Branch last March was only intended for Advertisers, Plating Establishments on the West Coast, and Members of the Branch; this distribution has been completed.

A limited number of copies are being offered for sale at \$1.00 each while they last. The book contains valuable information and would be cheap at several times the price.

Send Cash or Postal Money Orders to
Ernest Lamoureux, Editor
207 South Reno Street,
Los Angeles 4, California.

Members of *Los Angeles Branch* of the A.E.S. were told at the June 11th meeting how chromic acid anodizing is handled at three of the country's major aircraft factories.

John F. Beall, newly installed librarian, started off his tenure of office in grand fashion by arranging an educational program that presented three of the outstanding authorities in California on anodizing: *P. P. Mozley* of *Lockheed Aircraft Co.*, Burbank; *Manual Sanz* of *Consolidated-Vultee Aircraft Corp.*, Downey, and *Homer Youngs*, *Douglas Aircraft Co.*, Santa Monica.

In opening the educational session of the meeting, Mr. Beall explained that since chromic acid anodizing methods employed at plane plants differ in some respects, it had been decided to invite an engineer from each of the three largest plants in the Los Angeles area to give a 20 minute talk on the subject.

Mr. Mozley explained that when the Lockheed Co. first undertook to do anodizing it was faced with miscellaneous problems, not



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One Grade Grips All Grains — 250 to 20

AT LAST! You can say goodbye to the confusion of umpteen grades of polishing wheel adhesives. Switch to Gripmaster and enjoy the sweet simplicity of one grade doing every job! Get these four extra benefits, too:

1. No need for a special sizer.
2. No glazing on the wheel.
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NO OBLIGATION. SEND ON
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TODAY!

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POLISHING WHEEL CEMENT
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REGULAR SAWTOOTH

LEAD ANODES

For CHROME PLATING—ELECTRO-PROCESS

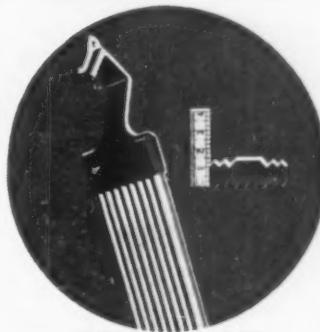
Lead Alloys

ANTIMONY
TELLURIUM
CHEMICAL

et al

SAWTOOTH—FLAT—HERRINGBONE
SPECIAL SHAPES

Consult Your Jobbers or Write Us



SUPER-SAWTOOTH

HEIL ENGINEERING COMPANY
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BARBER-COLMAN



TYPE FYBA
SEMI-BALANCED VALVE

*Write for Bulletin
"CONTROLS FOR INDUSTRY"*

MOTOR-OPERATED VALVES FOR INDUSTRIAL SERVICE

Barber-Colman electric *motor-operated* Valves offer a number of advantages for all types of process and other control systems associated with industrial equipment. They will provide reliable shut-off for gases and liquids because of positive power-driven seating, and can also provide accurate motor-driven positioning for proportioning service. Current is consumed only when the valve is changing position. Motors are available for either low-voltage or high-voltage lines. These valves are made in a wide range of sizes and types, for accurate, dependable service.

BARBER-COLMAN COMPANY
1205 ROCK ST. • ROCKFORD, ILL.

**MOTOR GENERATORS
by COLUMBIA**

Columbia Generators embody every feature essential for dependable, 24-hour operation. They are built for electroplating service in sizes of 6 to 20 volts, 500 to 20,000 amperes, for anodic treatment of aluminum in sizes of 40, 50, and 60 volts, 500 to 3,000 amperes. Columbia Generators for other electrolytic processes range from $\frac{1}{2}$ to 250 KW, 100 to 40,000 amperes, 6 to 60 volts. Write for full information.

COLUMBIA ELECTRIC MFG. CO.
4519 HAMILTON AVE., N.E. • CLEVELAND 14, OHIO

Chicago Office — 1525 E. 53rd St.

the least among which was the necessity for conforming to the many peculiarities of government inspection.

One of the major concerns in the early phases of this company's use of chromic acid anodizing, Mr. Mozley declared, was to find a way to keep the process under control and how much, and how often, acid should be added. Illustrating the trial-and-error procedure through which this firm passed in its experiences with anodizing, Mr. Mozley said that once it was discovered that over a period of 18 days 3,400 lbs. of acid had been added.

By learning something new each time, he explained, Lockheed's present satisfactory anodizing process has been developed. The experimental period, he said, began before the United States entered the war and when the company was still producing planes under English contracts.

Mr. Mozley expressed the opinion that airplane plants will continue to use chromic acid anodizing in preference to sulfuric for the larger work.

"We sometimes anodize whole plane assemblies," he pointed out, "and we do not like the idea of sulphates getting into areas of the assembly that have been treated with other solutions. If each part is to be anodized separately, then I agree that sulphuric anodizing, or some other method, will do; but not when the assembly is to be anodized as a unit."

Mr. Sanz described the solution, length of immersion time, current, types of anodes and cathodes and other features of chromic acid anodizing as practiced in the metal finishing division of the Consolidated-Vultee plant. He presented, also, a general discussion of the properties of chromic acid anodizing on aluminum.

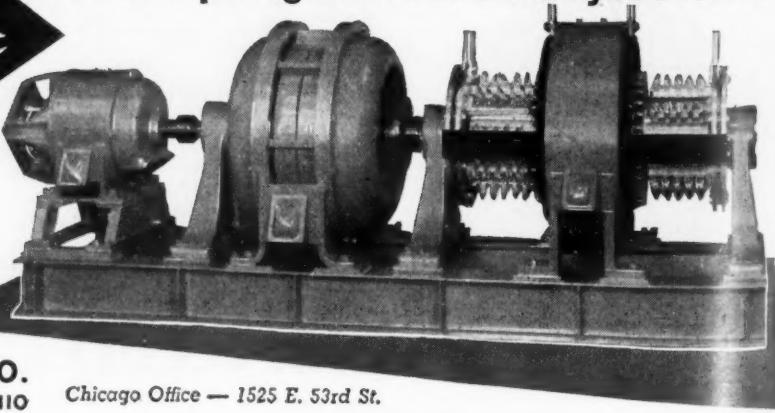
As the closing speaker, Mr. Youngs of Douglas Aircraft Co., outlined the experiences that company had in the course of developing a satisfactory anodizing technique.

The subject created so much interest among the 50 members present at the meeting that a 45-minute panel discussion was held after the speakers had concluded their formal addresses.

The business session was presided over by Branch President Edgar W. Wells.

Ray M. Brummet of the Oakite Co. was initiated into membership. In consideration of the O. D. T. suggestions against unnecessary use of automobiles, the branch voted

for Electroplating and other Electrolytic Processes



not to hold its annual picnic this summer.

The first meeting of the fall term, scheduled for the night of September 10th, will be held in the form of an "Open House Meeting," to which membership committee chairman Howard Woodward was instructed to advise all members to invite prospective members. Proprietors of plating shops will be asked to bring such among their employees who are not already members of the Society, and a general invitation is to be sent to other shop operators to attend with their staffs.

Visitors to the June 11th meeting included: J. E. Huff and B. L. Dell of Coast Plating Co.; F. B. Miller, D. Sutherland and W. Peilar of Harvey Machine Co.; Kurt Renner, Turco Products, Inc.; H. L. Slayden, Lockheed Aircraft Corp.; H. L. Haney, Harshaw Chemical Co.; L. Reynolds and E. W. Wilder, Adel Precision Products Co.; P. P. Hess, Aluminum Co. of America; George Rossner, Douglas Aircraft Co.; W. F. Grange, A-1 Plating Co., and Cliff Pierce, Palace Plating Co.

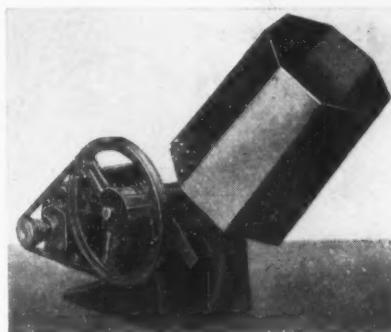
Toronto Branch

The final meeting of *Toronto Branch, A.E.S.*, for the season 1944-45 was held Friday evening, June 8th. Attendance was 50. No applications or elections. One resignation. All committees made favorable reports. Membership cards for distribution among the members were not regarded as of value.

One member said his bill-fold was stuffed full of permits now, no room for more. Everybody busy, some too busy. Considerable production of goods for civilian use was reported. A goodly number of visitors were present and apparently enjoyed the evening's program. It was one of the shortest sessions held in years. Business was taken care of in a snappy manner by the new president, Mr. James Vaughan.

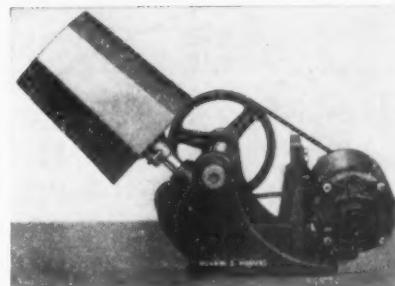
The feature of the evening was a talk by Dr. Stareck of the *United Chromium Corp.* Subject was "Zinc Finishes."

Dr. Stareck described two types of finishes, one for zinc and one for cadmium. There are yellow and black finishes, which appear different but are basically chromate finishes. A very small percentage of the zinc plate is converted into a further protective coating. These coatings have good heat resistance,



The BELFOR BARREL

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A tiny tumbling barrel especially designed for use where small objects are to be processed, and where lesser quantities are handled either in production or in the laboratory.

The barrel of octagonal shape measures approximately 6 inches across the flats at the open end, 5 inches at the attached end and 7 inches deep. It is driven by 1/20 H.P. motor.

The barrel may be readily removed from the end of the shaft for loading and unloading.

For TUMBLING, a plain steel welded barrel is provided.

For PLATING, a steel rubber-lined barrel with necessary electrical equipment may be procured. Hence, with the same base and motor, by the addition of one steel and one rubber-lined barrel, the unit may be used for either tumbling or plating.

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Electroplating Equipment and Supplies

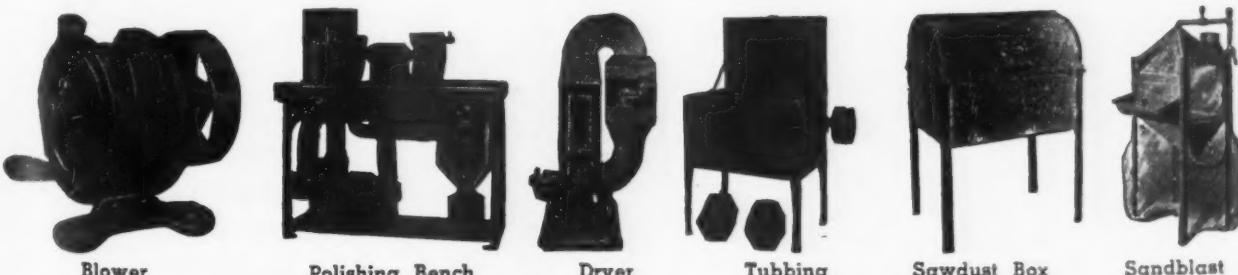
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THE BOLAND SYSTEMS FOR FACTORY INSTALLATIONS

Tanks, Coloring Rooms, Dynamos, Sawdust Boxes

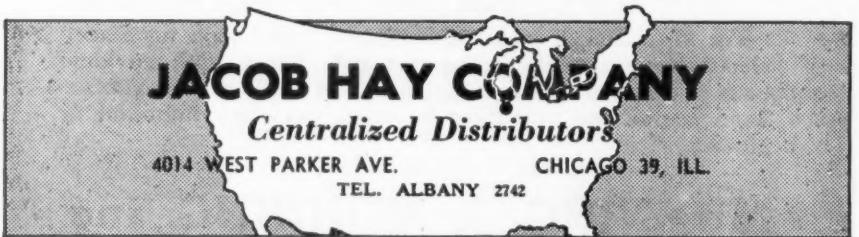
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CLEAN-RITE All-Purpose CLEANERS

**ANODES
BLACK OXIDE SALTS
BUFFS
CHEMICALS
CLEANERS
COMPOSITIONS
ELECTROPLATING EQUIPMENT
LACQUERS
PLATING RACKS
POLISHING EQUIPMENT
POLISHING WHEELS
SOLDER FLUX
STOP OFF MATERIALS
TANKS**

PLATING ROOM SERVICE

*Let us help you solve your problems.
Take advantage of our practical experience.*



PERMAG Cleaning Compounds

solve the hard metal cleaning problems that face the manufacturers still engaged in war-time mass production. Finishing any metal surface satisfactorily requires, first, that it be chemically clean.

PERMAG Compounds produce this clean surface quickly on steel, white metal, cuprous metals and their alloys, without a trace of injury to the metal.

We have a Technical Service available for anyone with a special cleaning problem. Write us about your difficulties in this field.

MAGNUSON PRODUCTS CORPORATION

Manufacturers of Specialized Scientific Cleaning Compounds

Main Offices: 50 Court St., Brooklyn, N. Y.
In Canada: Canadian PERMAG Products Ltd., Montreal-Toronto



are not affected by boiling water, and the yellow finish will stand a 200 hour salt spray test. To give the coatings greater protective value they are given a sealing treatment which consists of a brief immersion in either hot water or a dilute processing solution.

Dr. Stareck was given a hearty vote of thanks by the members for his very interesting talk. Numerous samples were shown to illustrate the effect of the various finishes described.

In the question box were these queries: How can one side of sheets be anodized without affecting the opposite side of sheet?

Answer—Insulate one side of each sheet and clamp two sheets together tightly.

Should iron be etched before chrome plated?

Answer—Etch with sulphuric acid or chromium solution.

Will high-speed copper oxidize satisfactorily?

Answer—Members knew of no reason why it should not.

What advantage has high-speed copper over ordinary cyanide copper plating?

Answer—Speed, thick deposits easily obtained, it is dense. Can be used in a barrel but requires more current.

Meeting adjourned at 10:00 P. M. until Friday, September 14th. Another half hour was spent in looking over the samples shown by Dr. Stareck, and in friendly chats and recital of fishing stories. Several shops will close for two weeks rather than have employees' vacations scattered throughout the summer.

W. S. Barrows.

National Instrument Society

A new national society to be known as "The Instrument Society of America" was organized in Pittsburgh on April 28th at a conference attended by delegates from 15 Measurement & Control instrument societies that have been growing in different industrial centers throughout the country. The purpose of the Society will be to advance the arts and sciences that are connected with the theory, design, manufacture and use of instruments. The Society is non-professional, and offers membership to any person, firm or institution interested in the objectives of the Society. Pro-tem officers were elected as follows: President—*A. F. Sperry* (Chicago); Vice-President—*C. F. Kyan* (N. Y.); Treasurer—*C. E. Fry* (Pittsburgh); Secretary—*Richard Rimback* (Pittsburgh). Various committees were also appointed to proceed with the organization work, and preparation of constitution and by-laws. The office of the Secretary is the temporary office of the Society and is located at 1117 Wolfendale St., Pittsburgh 12, Pa.

News from California

By FRED A. HERR

Announcing the completion of a new factory in Dallas, Texas, on June 23, *Kelite Products, Inc.*, manufacturer of industrial chemicals for cleaning and processing, has

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moved its Southwestern headquarters from Houston to Dallas.

F. L. Alexander has been appointed assistant national director with supervision over this new plant as well as all regional offices in the Southwestern division. Others named to posts in the expanded Southwest division include Earl Lester, divisional manager in charge of all Kelite service engineers in the Southwest; Roy South, plant superintendent, and F. J. Oxspring, plant foreman.

The new plant will serve the Southwest and Gulf Coast states. Other parts of the country will continue to be supplied by Kelite factories in Los Angeles, Chicago and Perth Amboy, N. J.

Among the first in the industry in Southern California to complete entirely new and larger plating plants in advance of the war's end is the *Service Plating Works*, operated for a number of years at 1821 Randolph St., Los Angeles, by Joseph Giovenetti.

The firm, in June, moved from 1821 Randolph St. to 1827 in the same block, where a new \$14,000 shop has been completed. The one-story shop and office structure, 24 x 20 feet in area, costing \$6,000, has been fitted out with approximately \$8,000 in new equipment. The new items include:

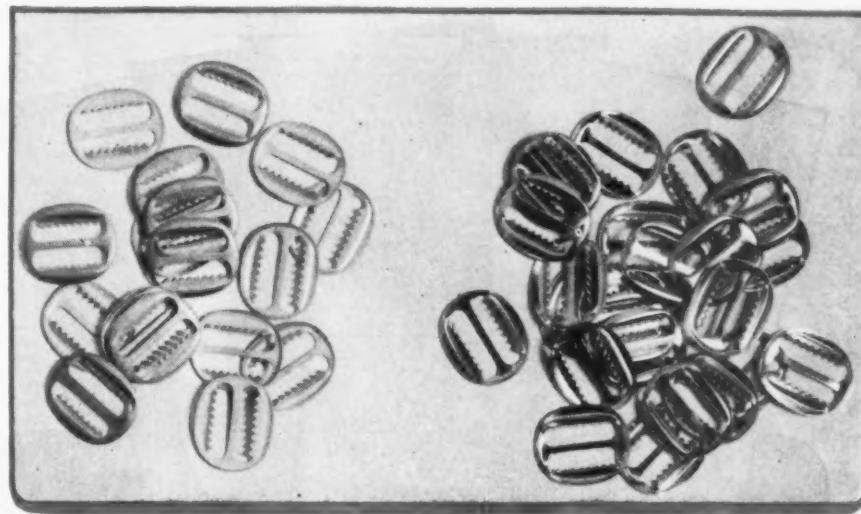
New plating tanks: three 7 x 2 ft. cadmium; one 8 x 3 ft. nickel; one 4 x 3 ft. chromium, and one 7 x 2 ft. copper. Other new equipment includes three tumbling barrels for nickel and cadmium work which, for the duration of the war, will be used mainly on Army and Navy plumbing articles; four buffing lathes, and miscellaneous auxiliary equipment, rheostats, motors, etc. J. B. Lamar is superintendent of the plating shop.

Lieut. Fred Maurer, who left his job as process engineer at the *General Electric* Co.'s plant in Ontario, Calif., in March, 1942, to serve as an Army materiel and process inspector, was discharged April 5 after completing 39 months of service.

Now back with G. E. in Ontario, Mr. Maurer has been assigned to the important post of superintendent of materials and process engineering in the G. E. "Hotpoint" plant. Lieut. Maurer was stationed in Los Angeles from March, 1942, to November, 1943, when he was transferred to Wright Field, Dayton, Ohio, headquarters of the Army Air Force Technical Command, as an inspector of protective coatings, materials and processes. He served a year at Wright Field and a year on similar duty in Detroit, Mich.

The wife of Don Bedwell, proprietor, *Bedwell Plating Co.*, Los Angeles, is confined to the Santa Monica Hospital, Santa Monica, Calif., with a fractured leg and pelvis sustained on Memorial Day when the automobile in which she was riding with her husband and daughter Lorraine was struck head on by another car. Bedwell suffered head and leg bruises; the daughter was uninjured.

At the June meeting of Los Angeles Ranch, A. E. S., Ernest Lamoureux proudly displayed a clipping from a mid-western newspaper which reported the award of the Bronze Star Medal to his nephew, Capt. John



One..two..Buckle your shoe...

That's how simple Luster-on* bright dip is to use on bulk plated work. Into the Luster-on* bath go the zinc-plated buckles — dull, gray, lifeless, unattractive, subject to staining, fingermarking and corrosion, sure to discolor leathers and fabrics on which they are used. A few seconds later all is changed!



KEMO SAYS:
Sorry we can't send samples of Luster-on*, but we will process and return pieces of work sent to us.

*Patent applied for

THE Chemical CORPORATION
93 Broad St., Springfield 5, Mass.

The buckles gleam and shine with the mirror-like brilliance of chromium. The Luster-on* surface is corrosion-resistant, even to salt spray. Fingers do not mark it. Fabric and leather staining ceases — and all this without the fire hazard of the usual water dip lacquering. Investigate Luster-on*, the sensational bright dip for zinc and put it to work for you, increasing your profits by improving your products.

5

THE CHEMICAL CORPORATION
93 Broad St., Springfield 5, Mass.

Please send me full particulars about Luster-on* bright dip for zinc surfaces. I am (am not) sending sample part for free dip. No obligation, of course.

Name.....

Address.....



COMPOUNDS: Burring, Cutting Down, Polishing, Mirror Finishing.

5-A CEMENT: Used for setting up Wheels, Belts, Buffs & etc.

HARRISON & COMPANY, INC., Haverhill, Massachusetts



In the new Globe Tumbling Barrel Catalog, partially illustrated above, you will find the final solution to your finishing problems. It contains complete information about the nine different types of Globe Barrels in their various sizes and capacities. You will find that there is a Globe Tumbling Barrel for almost every type of finishing operation—de-burring, burnishing, polishing, painting, japanning, or drying. All of them are designed to provide finer finishing at less cost. This new catalog plus Globe's Finishing Service Department are waiting to serve you. Write today!

*Here Are Seven Ways That Globe
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1. You can process thousands of pieces at one time.
2. You do not need specially skilled labor.
3. One man can operate several barrels simultaneously.
4. The purchase price of Globe barrels is low.
5. You have practically no upkeep.
6. Your operating expense is mainly power consumption which is negligible.
7. You obtain superior results.



THE VONNEGUT BRUSH - BACKED ABRASIVE HEAD

For deburring edges and corners. For smoothing rough surfaces. To prepare metal parts for other finishing operations.

The Vonnegut Brush-Backed Abrasive Head is particularly desirable for smoothing irregularly shaped edges and curved surfaces of materials offering too much resistance for efficient results with wire wheel brushes and of such contour that they cannot be worked to advantage with solid grinding wheels.

There is a big field for this new type of head and it may be the solution for one or several of your difficult clean-up problems. For further information write to,

VONNEGUT MOULDER CORP.
1852 MADISON AVE.
INDIANAPOLIS 2, INDIANA



View of Vonnegut Brush-Backed Abrasive Head with end cap removed, showing coiled magazine loading of 32 strands of abrasive cloth with ends extending along side 32 radially projecting brushes.

C. Dilsworth, Army ordnance officer, valorous action in the battle of Huertgen Forest, Germany. Capt. Dilsworth has been in service 4 years, 20 months overseas, Lt. Lamoureux disclosed.

Marcus Rynkofs, head of Liberty Plating Co., Hollywood, and Mrs. Rynkofs, were pleasantly surprised early in June by the announcement of their arrival home on furlough of their son, First Lt. Gene Rynkofs of the Marine Corps. In service for more than three years, part of which time he was stationed in Honolulu, Gene was transferred to sea duty aboard the carrier U.S.S. *Langley* in January. He wears two battle stars for action in the naval engagements off Iwo Jima and Okinawa.

His brother Stanley, formerly shop foreman of Liberty Plating Co., is a seaman first class, in charge of barracks, in Honolulu.

With work completed at its Culver City, Calif., plant on the HK-1, world's largest cargo plane, Hughes Aircraft Co. has transferred its armament division, with its large plating department, from 7000 Romaine Ave., Hollywood, to the main factory, Florence and Teale Aves., Culver City. Allie Sulzinger, assistant foreman of plating, reports. Space made available by completion of the plant, Sulzinger stated, made it possible for the company to close down the Hollywood plant and consolidate armament activities in a single plant at Culver City.

Censorship still cloaks some interesting facts on metal deposition involved in the construction of the huge plane on which the company has been working for nearly two years. An idea of the size of the project can be obtained from its overall cost—\$20,000,000. The Hughes' ship is reported to be the largest plane ever built. It is an 8-engine 200-ton job, with a wingspread of 300 feet, cargo capacity of 65 tons, plus 40 tons of gravity fuel, and a range of more than 5,000 miles. In June construction was underway on \$203,000 graving dock at Long Beach, Calif., to which the massive plane was to be moved in August for official launching.

Damage estimated at \$50,000 was caused by a recent fire to the plants of Cast Electric Development Co., 3209 Humboldt Ave., and the adjoining plant of Price-Pfister Mfg. Co., 3011 Humboldt Ave., Los Angeles.

While it was reported that the damage to the Price-Pfister plant will not seriously hamper production of aircraft fittings and tractor valves, the flames caused considerable damage to the Cannon Co.'s electric, sheet metal, plating and carpentry shops. The firm has been engaged in producing electrical connectors for Army rockets and later electric instrument panels. Carroll McLaw is plating room foreman at the Cannon plant.

James Lithgow Co., corrosion products manufacturers, have moved from 6355 Compton Ave. to larger quarters at 4657 Sherman Ave., Los Angeles. The new facilities and developments continue under the technical direction of James Lithgow.

D. W. Fernhout, formerly chief of the plant engineering section of the U. S. Maritime Commission on the west coast, has been named director of sales engineering.

SHOP PROBLEMS

(Continued from page 296)

Black Nickel

Question: We have used the black nickel plating formula as found in your *Plating & Finishing Guidebook* and find a considerable amount of zinc deposited. For our use, we must have an absolutely pure black nickel deposit. Is this possible with this type of plating? Can you also send information concerning a black chromium plating bath?

C. E. Co.

Answer: Pure nickel is not a black metal, and we do not see how it would be possible to obtain a black finish consisting of pure nickel. The same holds true for chromium. A standard chromium deposit will consist of approximately 75% chromium and 25% chromium oxide. The plating solution consists of the following:

Chromic acid	33 oz./gal.
Glacial acetic acid	0.3 "
Temperature	below 20° C.
Current density	1000-1500 amps./sq. ft.
Voltage	11-14

(German Pat. 110,226)

Bright Stripping

Question: We are having trouble stripping K white gold rings, especially rings which have protruding prongs and recessed engravings. Also, we have palladium settings on interesting gold rings which do not strip cleanly. Is there any special solutions required for stripping palladium settings?

We should be very much obliged to you if you could furnish us with a formula which would strip these rings efficiently for polishing. Evidently the throwing power of our present solution is not sufficient to clean underneath the prongs and the recessed engravings.

Would you also advise us at what voltage should do our stripping?

Any help you can give us will be very much appreciated.

B. F. H., Inc.

Answer: A good method for bright stripping gold is as follows:

- 1. Pickle in hot 10% sulfuric acid.
 - 2. Rinse.
 - 3. Treat with reverse current at six volts 190° F. in:
 - Sodium cyanide 6 oz./gal.
 - Rochelle salt 3 "
 - Potassium ferrocyanide 3 "
- Slow agitation should be used. For stripping palladium, we would suggest that you try immersion in concentrated sulfuric acid in room temperature, or reverse current at six volts in the following solution:
- | | |
|-------------------|-------------|
| Sodium chloride | 15 oz./gal. |
| Hydrochloric acid | 1/2 " |

Waves in Pewter Trays

Question: We would like to know if there is some way to straighten pewter trays that have gotten waves in the bottom from overheating, when grinding or buffing.

L. P. W.

Answer: To prevent the formation of waves in pewter trays due to overheating when grinding or buffing, it is suggested that sanding be substituted for this purpose.

RECONVERSION PLANNERS

INVESTIGATE

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INDUSTRIAL DEGREASING SOLVENTS FOR CLEANING ALL TYPES OF METALS AND MANY PLASTICS.

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TRY IT!

AN EFFICIENT ECONOMICAL METHOD OF

DEBURRING

SEND A FEW UNFINISHED SAMPLES

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★ TEST WORK REPORT
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CHROMIC ACID

99.75% PURE

With two complete, independent plants at Jersey City and Baltimore, and its own supply of the basic raw material Chrome Ore from company owned and operated mines, Mutual is the world's foremost manufacturer of Chromic Acid.



**MUTUAL CHEMICAL COMPANY
OF AMERICA**
270 MADISON AVENUE NEW YORK 16, N.Y.

Bichromate of Soda

Bichromate of Potash

Removing Oils from Aluminum

Question: Can you suggest a chemical solution that can be used to remove carbonized cooking oil from pure aluminum or cast (alloy) aluminum containers? Various oils are used as corn oil, soya bean oil, in popping pop corn. The carbonized oil adheres to the aluminum and it takes too much time and labor to remove mechanically. The coating acts as an insulation between the applied heat and the product is not sanitary.

1. Chemical must not damage the aluminum. Please advise how the chemical is to be used and at what temperature, concentration, and period of treatment.

2. Is there any treatment recommended for applying to aluminum to prevent carbonized oils from adhering to the surface?

S. W. P. Co.

Answer: Anodizing followed by a sealing treatment may be of help in preventing adhesion. Two patents which have been issued on methods of removing carbonized oil are as follows:

1. Soak in oleum containing 30% sulfur trioxide for ten hours with agitation at room temperature, or in hot 66° Baume acid. Rinse in 60° Baume acid and then 1% ammonia solution, following which the mut should be brushed off. (J. P. Adams, U. S. Pat. 2,228,026.)

2. Immerse in the following solution:
Cresol 50-67 parts
Dibutylphthalate 50-33 parts
(W. J. Backoff and N. D. Williams, U. S. Pat. 2,347,983.)

Plating Baby Shoes

Question: We want to get started in business of electroplating baby shoes, we need additional information.

If you have in your files any information that would help us in learning about this type of business, we would appreciate sending it to us. It was my thought that there might have a record of articles in magazines and books that we might obtain, or pamphlets put out by chemical or equipment companies dealing with this subject.

Do you know if there are any government restrictions at the present time on electroplating baby shoes with

1. Copper
2. Silver
3. Gold.

W. B. L.

Answer: A section on this subject appears on pages 101-4 of the 1942 edition of *Plating & Finishing Guidebook*. Since electrodeposited copper is the only satisfactory metal for this purpose, and the use of other metal has been prohibited since the outbreak of the war, there would be no legal metal available to you at present, of metallurgy such items.

Black Oxide Coating Test

Question: Do you or any of the readers of *Metal Finishing* know of any convenient positive test for establishing the presence of "black oxide" coatings on steel products? I would also like to know if such a test would differentiate between oxide coatings

PLATING RACKS by JOSEPH NOVITSKY

- We specialize in plating racks of our own patent.
- Constructed without screws, rivets, solder, brazing, welding.
- We design racks to suit your individual problem.

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(Phone—HOLLIS 5-6871)

Factory: 147-24 Liberty Ave., Jamaica 4, L. I., N. Y.
(Phone—REPUBLIC 9-7223)

produced as a result of heat treating and oxide coatings of the chemically applied variety.

M. M. J.

Answer: We would suggest that you treat the sample with dilute hydrochloric acid. If it is a caustic black coating, it will dissolve without any odor of hydrogen sulfide.

Heat treating scale is much thicker than the caustic black oxide and does not dissolve readily in this solution.



Silver Chloride for Silver Plating

Question: We have to silver plate a certain type pin in the aircraft motors we are overhauling. There is not enough silver cyanide available, but we do have a considerable amount of silver chloride. Is it possible to silver plate using silver chloride in place of all or part of the silver cyanide salt?

J. W. T.

Answer: Silver chloride would be very suitable for this purpose, although care should be taken that the anode hooks are above the level of the solution.

Silver chloride is not as satisfactory as cyanide, because of chloride accumulation which tends to give coarse deposits after a long period of time, and may cause corrosion of steel tanks.

Pachuca Tanks

Question: Will you please forward as soon as possible, "Specifications for Pachuca

ECONOMICAL, DECORATIVE SPEKWITE QUALITY PLATED FINISH

Tarnish Resisting...Faster Plating...Lustrous Finish

SPEKWITE plates quickly and directly on nearly all metals, and covers hard solder and most soft solders. Soldering and welding are easily accomplished on SPEKWITE plated work. Extremely high throwing power enables it to penetrate deep recesses. Used extensively on Government work. SPEKWITE has high salt spray resistance (about 1½ times nickel for same thickness), and is non-magnetic. Articles can be formed after plating without cracking or peeling. Plating can be controlled by plater at tank, or by laboratory. Ideal for plating in a steel tank, basket and barrel. *Economical*—only 1 lb. of SPEKWITE plates about 100,000 sq. in. minutes of work. Reflectivity is high—82% of silver.

ORIGINAL PATENTED COMPOSITION FOR DEPOSITING
A TRI-METAL ALLOY PLATE OF COPPER, ZINC AND TIN.
U. S. PATENT NO. 2,079,842 ISSUED MAY 11, 1937.

DRASTIC NEW REDUCTION IN PRICES
afforded by considerable savings in manufacturing costs.
SPEKWITE costs less than nickel plating for the same thickness.

WRITE FOR LITERATURE

Data sheets describing SPEKWITE in detail—advantages, properties, characteristics and price—will be sent promptly on request. There is no obligation.



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NEW YORK 3, N. Y.

Wood Tanks for Plating and Pickling

Excellent service on all types of Wood Tanks.

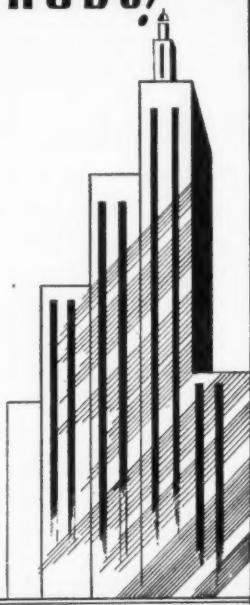
The shortage of metals has increased the demand for wood tanks for plating and pickling service. We can give excellent service on all types of tanks. Send us your inquiries.

Kalamazoo TANK & Silo Co.
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MODERN INDUSTRIAL CLEANING METHODS!

Removal of heavy oils, grease and drawing compounds from steel parts often presents a difficult problem, which no ordinary cleaning material will solve. AHCOLOID 70 produces the clean surface necessary for paint, phosphate coatings, electroplating or further fabrication.

And it does its work quickly, efficiently and economically.



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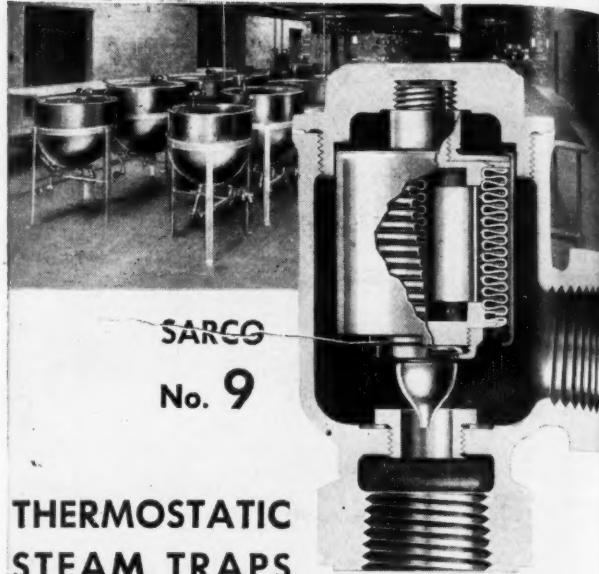
WATERBURY 88 CONN.



"I won't be in today!"

How many of these calls are due to skin irritations in your plant? Tarbonis can stop them! Not merely a protective—effective in clearing up the more difficult conditions. Clean and neat and can be applied on the job—promptly reduces itching and irritation. Many outstanding plants whose names are on every tongue in America appreciate the quick and effective action of Tarbonis. Write us for sample, dispensing manual and booklet for employee.

THE TARBONIS COMPANY
4300 EUCLID AVE. • CLEVELAND 3, OHIO



THERMOSTATIC STEAM TRAPS

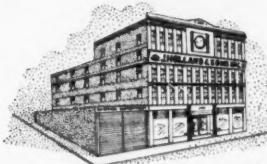
When you want maximum heat extraction and quick venting, the Sarco No. 9 is the steam trap to use. It works at all pressures within its range without changing seats. It is small, inexpensive, easy to install and cannot freeze. Sizes from $\frac{1}{2}$ to 2", 0 to 250 lbs. Ask for Catalog No. 250.

SARCO

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SAVES STEAM

SARCO CANADA, LTD., 85 Richmond St. W., TORONTO, ONT.



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Electroplating and Finishing Equipment
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MOTOR GENERATOR SETS

All Sizes and Types

Rheostats 50-1500 amperes with or without meters.

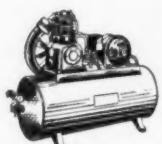
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Sizes 3-15 horsepower. Complete unit is ball-bearing, totally enclosed, Sturdy construction.



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Spray guns, Air compressors, Spray booths and complete paint finishing units. Baking ovens.



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276 South Ninth Street Brooklyn 11, N.Y.
AT BROADWAY

tanks" to dissolve steam shattered nickel
out into a standard Watts type nickel bath
using air agitation?
If you cannot furnish this information, we
will deeply appreciate any references to other
authoritative sources where it might be
obtained.

L. Of I.R.

Answer: We do not have any specifications
for Pachuca tanks. These are tall cylindrical
tanks with conical bottoms, the straight
part being usually 3-5 times the diameter.
An air jet lift extends through the center
for producing circulation. Such tanks are
available from manufacturers of chemical
process equipment, and we would suggest
that you consult the Chemical Engineering
Catalog for a list of such manufacturers.

Etching Aluminum

Question: We are in search of some
formula that can be used to etch aluminum
by electrolytic process. We work on 3S 1/2 H
and 24 ST and are at present producing
nameplates by etching the resist protected
metal in an iron chloride solution. This
solution is not constant as its strength de-
teriorates rapidly. After the plates are
etched the background is painted with flexi-
ble lacquers; mostly black or red. Any in-
formation you may have on the electrolytic
etching of aluminum and the dyeing or
coloring of the etched background will be
appreciated.

A. W. M.

Answer: We do not have any data on elec-
trolytic etching of aluminum. However, we
would suggest that hydrochloric acid be
added to the ferric chloride etch to prolong
its life.

For dyeing the etched background, the
article should be first anodized in order to
take the dye.

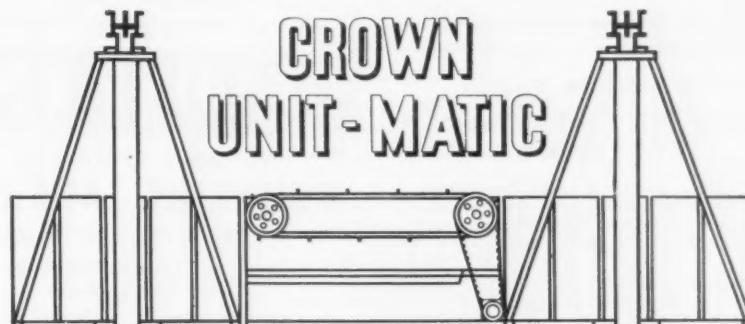
Data on this subject will be found on
pages 31-41 of the 1944 edition of the
Plating and Finishing Guidebook.



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GOVERNMENT'S DON'T TRAVEL RE-
STRICTIONS, BUT THIS CONTRACT
IS REALLY VITAL."

Crown

BRINGS TO THE PLATING INDUSTRY THE OUT-
STANDING EQUIPMENT DEVELOPMENT DURING
THE PAST QUARTER OF A CENTURY



(PATENT APPLIED FOR)

FULLY AUTOMATIC
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FOR
PLATING
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CLEANING
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CROWN RHEOSTAT & SUPPLY CO.
1910 MAYPOLE AVE. CHICAGO, ILL.



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DECORATIVE PLATING

Control Sets for Nickel, Chrom-
ium, Copper, Silver and
other solutions available.

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Specify Kocour Sets from your supplier.

**POLISHING ABRASIVE**

A new type, long wearing, economical abrasive grain. Perfected and introduced by us as a substitute for imported Turkish Emery. Leading defense plants now using large quantities for essential war-work, report excellent results.

Send for trial lot—Free

HAMILTON
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Established 1904
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**CHROMIUM—UDYLITE
SHERARDIZING**

For over a quarter of a century building and installing portable sherardizing furnaces and equipment; metal finishing and plating. We invite your inquiry.

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NOTICE—NOTICE

We have developed a machine for light buffing, coloring and scratch brushing which is indispensable in every shop.

Cost of power consumption is approximately one cent (1c) per hour.

Please send for literature
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Try PLATER'S PUTTY

A New Stop-off or masking compound

Prices	1 lb. jar	\$3.00
REZISTAL "A"	2 lb. jar	5.00
	5 lb. jar	10.00

Order a trial jar today—guaranteed satisfaction
PLATING PROCESSES CORP. • Holyoke, Mass.

**CHROMIUM PLATING
SCREWS—RIVETS—
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SMALL PARTS, ETC.**

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OXYDYZENE**HIGHEST STRENGTH
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1945 EDITION**OF PLATING and
FINISHING GUIDEBOOK**

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IN AUGUST.



ODDS and ENDS

The Printed Page:

From *Silicate P's & Q's*: "One common method (for keeping silverware bright) is to place the silver in an aluminum pan and heat in a mild solution of soda. The electrolytic cell thus set up results in a migration of the tarnish coating to the aluminum which blackens perceptibly but leaves the silver as shiny as though it were hand polished." We agree with the practice but take mild issue with the theory. In the first place, the black silver tarnish being silver sulfide, any migration of the sulfide to the aluminum would result in the formation of aluminum sulfide, which is yellow, not black. Actually, the reaction involves reduction of the silver sulfide by the nascent hydrogen liberated at the silverware cathode, accompanied by solution of the aluminum anode of the electrolytic cell. In the second place, the blackening of the aluminum is due to the impurities left behind when the aluminum dissolves in the soda and would occur even if the tarnished silverware were not present, as anyone who has etched aluminum in alkalies could testify. The author also points out that metasilicate is not suitable as the electrolyte, which is to be expected in view of absence of attack of this compound on aluminum. That is what makes metasilicate a good cleaner for aluminum. In the third place the reduction of the silver sulfide film results in a dull silver surface which requires polishing to produce a luster.

Facts that are not frankly faced have a habit of stabbing us in the back.
—BOWDEN.

According to the *New York Times*, five fathers, including two with children, were sent to the induction center by their draft boards because of absenteeism and job jumping. What did the other three have, cocker spaniels?? This same paper also ran an ad offering a radio drill for sale, leaving us uncertain as to whether the drill was a robot, was used for drilling radio parts, or whether they meant radial drill.

How Much Do You Know?

(Prepared by George Black)

Match the thickness figures in column I usually specified with the plating types listed in column II.

Column I	Column II
A. 0.001	() Cadmium plating
B. 0.003	() Zinc Plating
C. 0.002	() Chromium Plating, Type I
D. 0.0002	() Chromium Plating, Type II
E. 0.0003	() Cadmium Plating, Threaded Parts
F. 0.0005	() Nickel Plating, Type I (Ferrous metals)
G. 0.00003	() Nickel Plating, Type I (Non-Ferrous metals)
H. 0.0001	() Nickel Plating, Type II
	() Zinc Plating, Subject to Salt Spray
	() Tin Plate, Flash Coat

Answer key will be found on page 322.

Live and Learn Dep't:

It will be a surprise to many to learn that rhodium is about equal in hardness to chromium, its hardness being about 800 Vickers. And although its use in plating is comparatively recent, it was discovered over 140 years ago.

Editorial Influence:

Despite our pounding away during the last couple of years on the point that the removal of burrs is correctly termed *burring*, and that the word *deburring* isn't even listed in the dictionary, a quick check of our advertising pages indicates that our advertisers prefer the latter by a margin of almost *two to one*. Just a voice crying in the wilderness—that's us!

Slogan of the Month:

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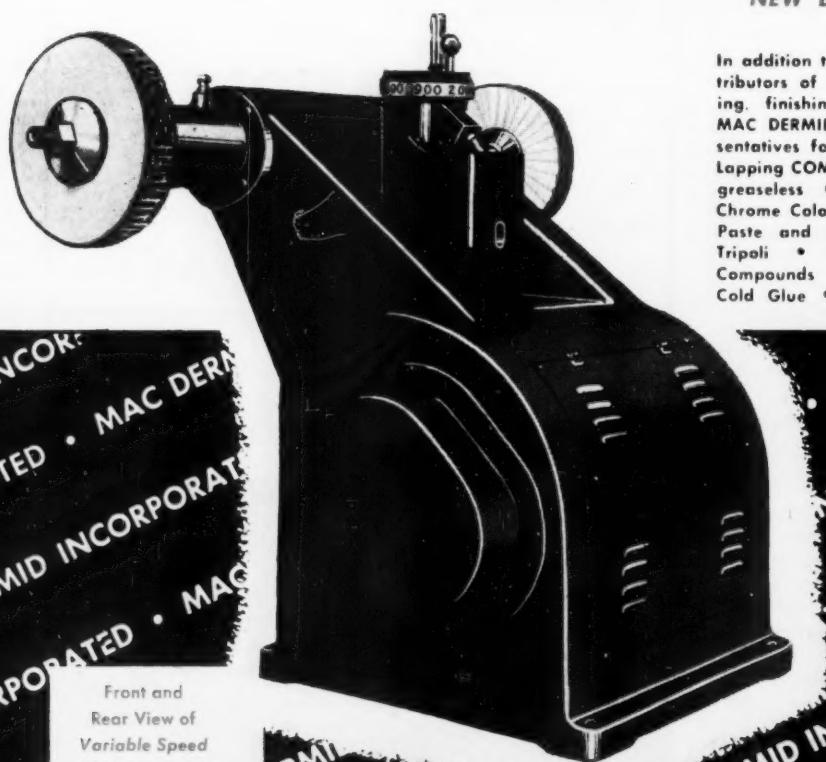
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